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THE ROLE OF FRIENDSHIP WITHIN SOCIAL NETWORKS OF DIVISIONS AT RECRUIT TRAINING COMMAND AND ITS EFFECT ON THE RESILIENCE OF NAVAL RECRUITS

June 2017

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13. ABSTRACT (maximum 200 words)

The overall purpose of this project is to explore the connection between friendship and venting networks, and how they relate to the self-reported resilience levels of Navy recruits during basic training. This study hypothesizes that there is a positive relationship between friendship and venting networks, and that positive network attributes contribute to greater resiliency. Additionally, it hypothesizes that groups who received resilience interventions were more likely to report higher levels of individual and divisional resilience when compared to the control groups. Data for this project was derived from surveys conducted at Recruit Training Command (RTC) in Great Lakes, Illinois, in the summer of 2015. The 1,065 surveys come from a population of eight different recruit divisions taken at two different time intervals. This project used quantitative analysis to assess the relationship between friendship and venting networks and resilience. The results indicate that there is a relationship between friendship and venting networks, and that resilience interventions positively affect the network attributes as well as individual and divisional resilience. This project provides a basis for future study of resilience interventions and their effect on social networks in the military in order to promote resilience among its members.

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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Appreciative Inquiry
AFQT	Armed Forces Qualification Test
BRS	Brief Resilience Scale
QAP	Quadratic Assignment Procedure
RDC	Recruit Division Commander
RTC	Recruit Training Command
T1	Survey Time Period 1
T2	Survey Time Period 2
T3	Survey Time Period 3
T4	Survey Time Period 4
UCINET	Social Network Software created by University of California, Irvine

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I. INTRODUCTION

A. RESILIENCY

Because of the difficult nature of military life, having a force of resilient members is in the best interest of the Navy. The Navy is concerned with promoting healthy attitudes and behaviors in order to offer the best chance to sailors for overcoming persistent and acute hardships. In 2009, the Navy began the Operational Risk Management and Operational Stress Control program aimed at helping sailors recognize and deal with stress, and to minimize its impact to their personal and professional lives (Bureau of Personnel, 2017).

Due to the value that the Navy places on the readiness and mental health of its sailors, we seek to identify links to Naval personnel and increased resiliency. Boot camp is a unique and stressful environment and is ideal for examining the effects of a mentally and physically challenging atmosphere on perceived resilience. We aim to build on the existing studies of recruit resilience and add to the body of research to find additional pathways for increased mental and physical readiness to build a stronger and more adaptable Navy force.

For most organizations, personnel are one of the most valuable resources. Direct costs for active duty personnel make up approximately 18% of the Navy's yearly operating budget (SECNAV, 2016). This figure does not include contributions to retirement account funds. Attrition of sailors because of mental or physical injuries, or other forms of attrition, means that the Navy will have to replace those sailors; which will cost more time and money. A resilient naval force, therefore, is one that is more productive, less costly, and healthier. With dwindling Department of Defense budgets and increasing world turmoil, the demands on the Navy will continue to grow. Some might say '"do more with less,"' but the reality is that one can only do less with less. Burdening Navy personnel with more tasks on the job and requiring them to deploy more frequently takes a toll on this most precious resource. If sailors are able to withstand these

pressures and perform well in spite of them, this will greatly benefit the Navy. A resilient naval workforce is not only what the Navy wants, but what the Navy needs.

We intend to explore whether there is a link between friendship and venting networks, and the perceived resilience levels of sailors in recruit training in the course of this study. We further intend to explore the use of interventional for some of the recruit divisions, to find out if it helps recruits understand how to use their own positive thoughts and self-talk during group discussion to navigate their way through training. Does teaching these skills early allow recruits to use the techniques they learn and apply them later in the fleet as well as in their personal lives?

B.   BACKGROUND OF NAVAL RECRUIT TRAINING

Naval recruit training, also known as "boot camp," lasts approximately seven weeks and is located at Recruit Training Center (RTC) in Great Lakes, Illinois. Over the years, there have been previous locations for recruit training, such as Orlando, Florida, and San Diego, California, but the Great Lakes command is now the only training site in use. Recruits spend seven weeks learning about various subjects that include the history of the Navy, rank structure, military customs and courtesies, as well as seamanship and firefighting so that they are adequately prepared to join the fleet. The initial seven weeks spent in training prepares recruits mentally and physically to enter the fleet and be productive members of the Navy.

C.   IN-PROCESSING FOR NEW RECRUITS

The first week of boot camp is time set aside for indoctrinating new recruits. This time frame is called processing days or "P-days." Sailors receive their first set of Navy uniforms; they undergo medical and dental screenings to include drug testing, vision tests, and a series of vaccinations. Recruits receive initial training on basic military procedures and other relevant information to prepare them for their new journey (RTC, 2017). The first dose of what boot camp will be like occurs during P-days—and it can be a shock to the senses. This is a time of "rapid re-socialization and enculturation occurring under conditions of relative isolation and confinement" (Novaco, Cook, & Sarason, 1981,

p. 8). Recruits learn an entirely new way of life, complete with a new language, new uniforms and culture, steeped in years of tradition and history.

D. CHALLENGES OF BOOT CAMP

Sailor candidates must endure mental and physical challenges during their seven weeks in boot camp. The process by which a candidate becomes a sailor is called "sailorization," and refers to the way the Navy prepares fresh recruits to become fully fledged members who are able to function successfully in the fleet (RTC, 2017). Sailors are placed in groups called divisions, made up of about 60 to 80 members. The divisions are either integrated (males and females in the division) or male only. Integrated divisions work and eat together, but sleeping quarters are segregated according to gender. While at RTC, divisions are housed in barracks, which are designed to look like an actual Navy ship.

Novaco et al. (1981) describe the construct of boot camp as "designed to impart the basic skills, attitudes, and behavior deemed essential for mission performance, as well as inculcate the language and demeanor characteristic of the service branch" (p. 8). This is a time of intensely rapid change in the recruit's life and it is peppered with punishments and rewards as a means of shaping the behavior of new recruits in order to transform them from mere civilians to highly functioning military members (Novaco et al., 1981). Naval researchers (A. Williams et al., 2004) conducted a study on recruits at RTC over the course of two-and-a-half years to assess an intervention called BOOTSTRAP, which is short for "Boot Camp Survival Training for Recruits−A Prescription" (p. 814) for recruits who might be at risk for depression, difficulty adapting, coping or having other interpersonal issues while in training. The researchers were particularly interested in using military recruits in basic training because it was such a unique setting, unlike civilian places of employment. "Navy recruits make an ideal population to examine these factors since these young people are placed in a novel, stressful, and unusual environment where many of their activities are similar and controlled" (A. Williams et al., 2004, p. 814).

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E.   CIVILIAN TO SAILOR TRANSFORMATION

The Navy transforms civilians into sailors by teaching recruits a broad range of topics, including physical fitness, basic seamanship, firearms training, firefighting aboard ships (firefighting and basic shipboard damage control), naval heritage and history, naval rank structure and insignia, customs and courtesies, as well as team building exercises (RTC, 2017). The instruction is provided in a variety of settings, sometimes in a classroom, led by instructors, and other times as computer-based training allowing students to go at their own pace. The basic seamanship and firefighting training is held on the "USS MARLINSPIKE," which is a custom-built structure created to resemble a ship in order to make the training as realistic as possible (RTC, 2017). The firefighting portion of boot camp is an essential part of the training and can be stressful both physically and mentally, as recruits don heavy firefighting ensembles or FFEs in a hot, dark, and smoky environment so they get an idea just how difficult it can be to fight a fire at sea.

Divisions are led by Recruit Division Commanders (RDCs) who are exemplary sailors hand-selected from the fleet by their superiors to mold, guide, and prepare recruits to enter the force. The culmination of boot camp occurs around the sixth week when recruits go through a final testing phase called "Battle Stations," which tests recruits mentally and physically on what they have been taught so far. After successfully completing Battle Stations, the recruits earn the privilege of no longer being called recruits, but sailors. It is an emotionally and physically exhausting, yet rewarding rite of passage for these previous civilians to go through. The final step before recruits become newly minted sailors ready to enter the fleet is called "Pass in Review," which is essentially a graduation ceremony, so that recruits can have their friends and family witness this important new stage of life (RTC, 2017).

II.   LITERATURE REVIEW

A.   INTRODUCTION

Much of the literature on resilience implies that it is not just a distinctive feature a person possesses, but a skill that can be learned (Coutu, 2002; Cicchetti & Luthar, 2000). With the right support and resources, an individual can adapt and overcome adversity (Coutu, 2002; Masten, 2001). Yet the research has little to say about friendship networks or venting networks and resilience. Some research has focused on social capital and supportive relationships, but nothing linked directly to the influence of friends or acquaintances who are willing to listen to their frustrations and the corresponding effect on resilience.

1.   Overview

In this we review, will focus on resilience and social networks, specifically, friendship and venting networks. We will look at resilience of recruits at the individual and the organizational level. Additionally, we will look at social capital, cohesion, and psychological safety. We intend to explore these specific topics as we hope there is a link to perceived resilience levels in Naval recruits and we feel that the current literature does not focus on the aspect of friendship networks and venting networks, and resilience. Previous studies by Burt and Barr (2015), Challburg and Brown (2016) and Watling (2016) provide examples of the basis for our study as we build on their previous research on the resilience of Naval recruits.

In particular, survey questions created by Challburg and Brown (2016) are utilized in this analysis to further explore the study of resilience among Naval recruits and social networks. Studies by Challburg and Brown, and Watling, as well as this one, use survey questionnaires created by Challburg and Brown. The surveys were conducted with eight divisions, labeled D1 through D8 in this paper, and at four different time periods that occurred during week two, week four, week six, and week seven, labeled T1, T2, T3, and T4 in this paper, of the seven weeks at boot camp. Following the T2 survey,

an intervention was conducted with six of the eight divisions. Divisions D1 and D2 received no intervention and are considered the control group. Divisions D3 and D4 received Intervention 1, consisting of positive self-talk exercises aimed at building individual resilience based on experiences at boot camp. Divisions D5 and D6 received Intervention 2, which consisted of a RDC led after-action, debrief following a group exercise focused on individual and group performance. Divisions D7 and D8 received Intervention 3, consisting of guided conversations focused on increasing both individual and division resilience. A detailed description of the interventions used can be found in Challburg and Brown's (2016) thesis titled "Resilience among Naval Recruits."

The aforementioned studies by Burt and Barr (2015), Challburg and Brown (2016), and Watling (2016), as well as this one use three separate appreciative- inquiry based intervention techniques as described by Challburg and Brown. The intervention techniques used will be explained further in our methodology section; however, we will discuss briefly the appreciative inquiry interventions, and explain in further detail about them later in the literature review.

Appreciative inquiry is a form of change management that can be used in organizations to improve performance. The intention is to use positive framing techniques in a questioning manner to illicit thought provoking behavior in people so they focus on positive ideas instead of negative ones (Cooperrider & Whitney, 1999). Cooperrider and Whitney describe appreciative inquiry (AI) as a "cooperative search for the best in people, their organizations, and the world around them" (1999, p. 10). As mentioned previously, the focus is placed on the positive and not the negative. An intervention using this technique with recruits is meant to offer recruits a chance to slow down and look at some of the positive things around them. Recruit training is very fast paced and the intervention period is a time to take stock and regroup, which is a rare thing in such an environment, intended to promote self-reflection, growth and esteem building.

2. Navy Definition of Resilience

The Navy defines resilience as "the process of preparing for, recovering from, and adjusting to life in the face of stress, adversity, trauma, or tragedy" (NTTP 1–15, 2010). It has been otherwise described by scholars as an ability to bounce back, or to adapt to and overcome a mentally or physically tough situation (Connor & Davidson, 2003; Cicchetti & Luthar, 2000). Some researchers believe that certain resilient people possess characteristics that can help them to thrive in the face of hardship (Carver, 1998; Coutu, 2002). We are interested in exploring ways that resilience can be improved in Navy sailors so that they are better prepared to deal with the stressors of military life and be more productive and healthy.

B. RESEARCH QUESTIONS

In this project, we explore several questions regarding social networks, specifically, friendship and venting networks, of Naval recruits during basic training.

1. We intend to explore the relationships between friendship networks and venting networks to identify how they may change over time and discover if they differ among different intervention groups. Figure 1, is a visual representation of Research Question 1.
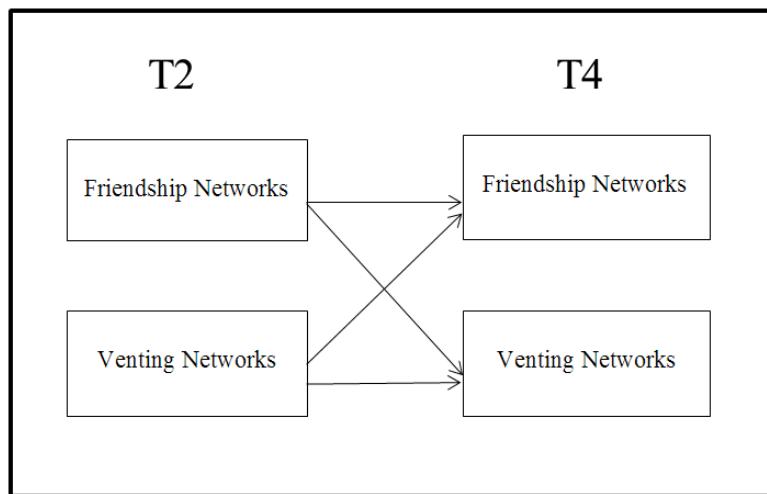
Figure 1. Research Question 1.

2. Do cohesion and psychological safety scores from surveys conducted earlier in boot camp predict friendship and venting networks ties later, and is there a difference among intervention groups? Figure 2, is a visual representation of Research Question 2.
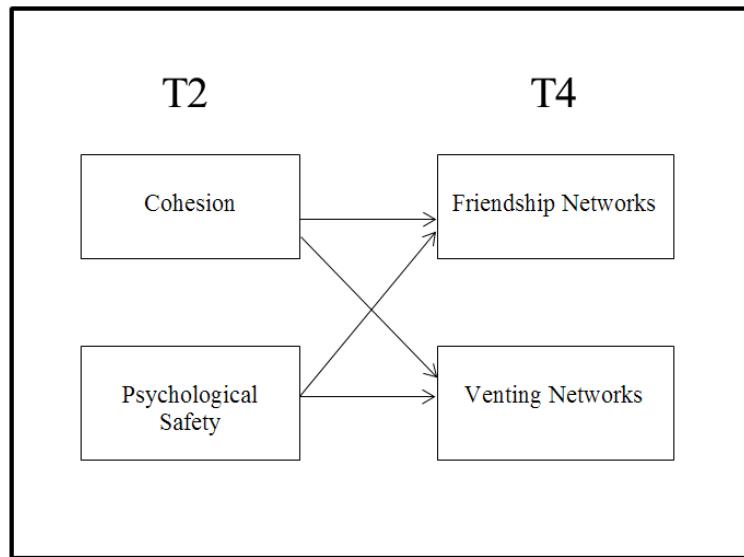
Figure 2. Research Question 2.

3. Do friendship and venting network attributes predict the level of individual and organizational resilience, and is there a difference between intervention groups? Figure 3, is a visual representation of Research Question 3.
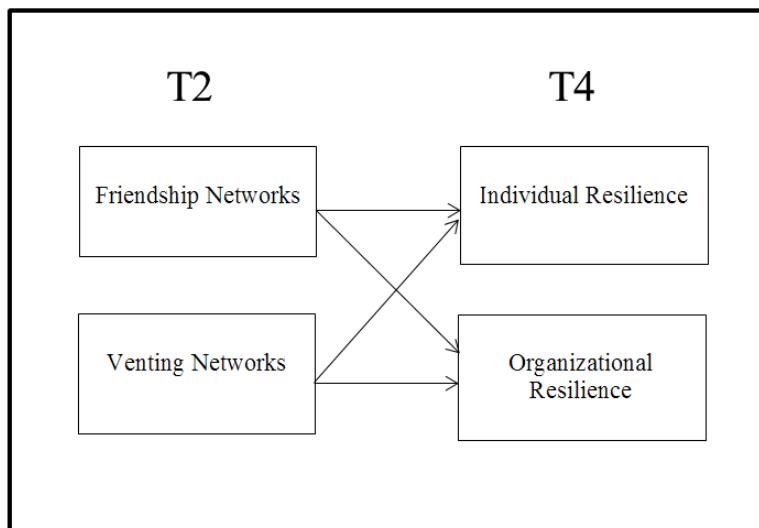
Figure 3. Research Question 3.

C. SOCIAL NETWORKS

Social networks are defined as a set of relationships between individuals and the characteristics that those individuals possess when they interact (Borgatti, Everett, & Johnson, 2013). Taking a step back to describe a network, which is the foundation of social networks, Charles Kadushin describes it as "a set of relations between objects which could be people, organizations, nations, items found in a Google search, brain cells, or electrical transformers" (Kadushin, 2012, pp. 3–4), which implies that networks are made from not only people, but entities and concrete items.

Our research will build on work by Watling (2016), observing social networks of naval recruits and the effect on resilience levels of recruits at the individual and organizational level. While Watling focused on positive energy networks of recruits, we will examine friendship and venting networks to develop an understanding of the effect they may have on resilience in a stressful boot camp environment. We feel that it is worth investigating the potential pathways to foster or improve resilience in recruits in such a challenging environment. Not only is it valuable at the entry level for military service, but for later stages in a military career as life in the service presents unique challenges to members compared to those of a civilian worker.

Bottrell cites networks as "important sources of information and assistance for successfully settling into and gaining confidence in new educational or work environments and provide a base from which to build new networks" (2006, p. 480). New recruits experience an environment unlike any other in boot camp and their ability to navigate social networks and capitalize on the resources available to them, such as interventions geared towards improving their resilience, can be beneficial to their personal and professional growth. This exposure to a learning process is also beneficial to recruits once they are sailors in the fleet dealing with countless types of stressors that make up military life.

As pointed out by Kadushin's definition of a network above, a relationship can be found among most components, whether they be people or things (2012). Knowing how or why interactions occur between people, in particular, can provide insight into how to

treat individuals and groups of individuals in the military setting. We can study the attributes within organizational networks to better understand the ties among groups in order to make inferences about perceived resilience on an individual and organizational level and use that knowledge to help build resilience in the Navy.

D.   FRIENDSHIP NETWORKS

Friendship networks are a subset of social networks and refer to a set of individuals who have a connection based on the bond of friendship (Gibbons, 2004). The alliance can be loosely based or a closer relationship that is founded on trust, but both types of alliances are generally centered on shared similarities (Gibbons, 2004; Kilduff & Tsai, 2003). The development of friendship is often because of common interests and is reinforced because of shared experiences, which results in a mutual trust between friends (Gibbons, 2004). A study by Christakis and Fowler cite a friendship network found between obese individuals, and discovered that over time the connections became more pervasive and that the chances of obesity increased among linked members of that network (Christakis & Fowler, 2007). This study is an illustration of two features of social networks: homophily; that like-minded people tend to have an affiliation and two, that the associations which like-minded people form will have implications on their behavior, such as mimicking (Kadushin, 2012).

Friendship in the workplace can be associated with sharing of resources during times of adversity, commitment to the unit, and making decisions about career changes (Gibbons, 2004). Connections developed in a work environment, such as recruit training, can have a significant impact on members simply because of the significant amount of time spent together, and the quality of those relationships can have an impact on how the unit will function (Dutton & Heaphy, 2003).

Dutton and Heaphy define connections between individuals in a medical sense, as either "life-giving or life-depleting" because the connections are either very beneficial to the individual and are "high quality connections" or the connection is "weak" and not helpful, even possibly hurtful (2003, p. 263). Healthy connections offer something to an individual in the form of social support, which is useful to individuals as well as to

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organizations they belong to. We wish to explore whether the connections formed in recruit training are beneficial to coping and offer a support network to those who seek out companionship and confidants.

E.   SOCAL CAPITAL AND VENTING NETWORKS

While there is no universal definition of social capital found in the literature, it can be described as "the existence of voluntary community networks and relationships based on trust and the use of these networks and relationships to enable positive social action" (Kelly, Davoren, Mhaolain, Breen, & Casey, 2009). An alternative definition from Knoke (1999) is that social capital is a mechanism whereby actors tap into to other actor's resources within a social network so they can utilize those resources as well as the extended resources that the actor may have with other people in the network. It is advantageous for someone to form a connection with someone with meaningful resources. The more abundant and strong the connections a person has with resourceful people or groups, the better equipped that person is (Gabbay & Leenders, 2001). Stronger connections within a network can impart mutual trust and "reciprocity" among members (Krackhardt & Stern, 1988). Greater level of trust could mean there is a pathway to a higher level of perceived psychological safety.

While there is no definition in the research for a venting network, for the purposes of this study, we define it as someone that a person can rely upon for sharing feelings and frustrations when encountering difficulty. Recruits might have several different people to rely on to share their frustrations or troubles with. The venting network then refers to the group or groups of people with whom a recruit finds comfort in sharing and discussing problems. The venting network can be seen as a type of support system for the recruit to utilize as needed, a resource to draw on when the frustration level is high. For a recruit to feel sufficiently comfortable to use a resource to confide fears or concerns, there must be some level of trust. A study in San Diego, California by Stanton-Salazar and Spina (2005) of minority youth peer networks showed that trust was especially important in peer relations and it determined whether confidences were shared or not. Without trust, there was no basis for a healthy relationship. The study found that "enriching and

supportive peer relationships and networks also appear to buffer the adolescent from environmental stressors…and to enable the adolescent to develop relationship-based coping strategies that foster resiliency" (Stanton-Salazar & Spina, 2005, p. 411).

Stanton-Salazar and Spina (2005) also believe that social capital among peers can be instrumental in building resilience. The ability to vent to friends or acquaintances can have a stress relieving effect for someone experiencing difficulty. The role of friends, family or other acquaintances that hold the role of supporter can mitigate frustration by allowing individuals to unburden themselves of a perplexing problem (Wilks & Spivey, 2010).

In the recruit environment at RTC, shipmates in the division can become mere acquaintances or closer friends, allowing them to share frustrations and ease their minds in order to make sense of their new environment. Basic training is a very stressful place and having someone to vent to or let off steam with can be a valuable resource. Recruits can build connections within their division and create social capital within the group. The social capital, once formed, is an example of a resource available to the recruit for use in times of difficulty or stress. According to Krackhardt and Stern (1988), friendships will form more frequently and abundantly if people are grouped together as a single unit rather than separated into smaller subunits. In that case, the division organization at RTC is ideal for the formation of friendship among recruits because they are together in a single unit (the division) for the seven-week duration of boot camp.

Leana and Van Buren (1999) describe organizational social capital as "an attribute of organizations" and define it as "a resource reflecting the character of social relations within the organization, realized through member's levels of collective goal orientation and shared trust" (p. 540). While at RTC, recruits are operating on the individual and organizational basis every day. As a part of the organization (division) recruits are tested as a team during some events, but recruits must also pass various individual tests and inspections in order to advance through training and graduate from boot camp. We hypothesize that strong friendship and venting networks are beneficial to the division and to the individual sailor's resilience levels.

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Hypothesis 1:

a) We expect to find divisions who receive interventions will display higher density and reciprocity scores in their friendship and venting networks compared to the control group divisions.

b) Friendship and venting networks will be positively related and there will be a higher correlation between the networks of divisions who received interventions compared to those who did not.

F.   COHESION

Military unit cohesion is defined by Martin, Rosen, Durand, Knudson, and Stretch (2000) as "a sense of group integration and personal bonding among service members as a result of their regular face-to-face interactions during work, training, or warfighting maneuvers that is ultimately directed toward meeting the goals of the unit's military mission" (p. 24). Military unit cohesion has been linked to positive effects on physical and psychological well-being (Martin et al., 2000) as well as decreasing stress (Martin et al., 2000, J. Williams et al., 2016).

Williams, Brown, Bray, Anderson Goodell, Rae Olmsted, and Alder (2016) assessed "unit cohesion, resilience and the mental health of soldiers in a basic training" environment (p. 241). They found that as unit cohesion increased, so did resilience, while psychological distress decreased (2016). The conclusion of the study by J. Williams et al., suggests that the increase in resilience could be linked to the presence of unit cohesion and that cohesion may "provide the foundation by which soldiers are able to avoid negative psychological symptoms and increase performance" (p. 247). According to Martin et al. (2000) the "quality of relationships between military peers" has a distinct impact on the "well-being, social functioning, and combat readiness of individual soldiers," p. 24).

Burt and Barr (2016) studied leadership and cohesion among naval recruits and posited that cohesiveness in a group can foster an atmosphere where members feel psychologically safe and supported and would therefore have higher resilience because of the emotionally supportive environment (p. 14). This is in line with the 2016 research by J. Williams et al. mentioned above, which points toward a relationship between cohesiveness and resilience, which we aim to explore further in this study. We hope to

find a link between cohesiveness and psychological safety of recruits and their reported resilience over time.

Britt and Oliver (2013) argued that there is a link between military unit cohesion, morale, and resilience. The tighter the cohesion, the better the morale of the group leading to improved resilience of individuals. Britt and Dickinson (2006) promote the concept that high levels of morale can be observed in individuals who are self-confident, optimistic, and hardy. This is similar to Diane Coutu's (2006) research that resilient people possess three characteristics: a feeling that life is meaningful, an acceptance of reality, and the knack for improvising. A person who is realistic and has a firm grasp of the severity of the situation is better able to deal with it than someone who is not as aware or as resourceful.

G. PSYCHOLOGICAL SAFETY

Psychological safety is often described as a team concept (Soares & Lopes, 2014), but it can apply to an individual as well. Individual psychological safety refers to an atmosphere where a person does not feel threatened and where they feel they can speak openly about their thoughts without fear of repercussion or negative side effects (Soares & Lopes, 2014). Edmondson (1999) defines team psychological safety as "a shared belief that the team is safe for interpersonal risk taking" (p. 354). Edmondson further describes this feeling of safety within the team as stemming from a "team climate" that is based on trust and "mutual respect" in which the team members do not feel the need to alter their behavior because of being a part of the group (p. 354).

Soares and Lopes (2014) posit that the psychological safety of a team is influenced by a central member of the team and that member's feelings of psychological safety will be spread throughout the team because of their centrality. Some believe that the state of the psychological safety of a team is the result of shared experiences and the way the team thinks they are expected to behave (Edmondson, 1999, Soares & Lopes 2014). If negative experiences are shared by the team it could lead to a feeling of low psychological safety. This suggests that leadership, whether held formally or informally (in the case of a central actor within a network) is instrumental to the development of

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psychological safety for an organization (Soares & Lopes, 2014). Given the right atmosphere, individuals who feel safe in their environment will be less likely to hide their true thoughts and will be more willing to contribute to the efforts of the team resulting in a more productive and cooperative outcome. We hypothesize that cohesion and psychological safety among recruits is linked to specific social networks.

Hypothesis 2:

a) Division recruits with higher cohesion scores initially are more likely to have relational ties in the friendship and venting networks later.

b) Division recruits with higher psychological safety scores initially are more likely to have relational ties in the friendship and venting networks later.

H.   RESILIENCE

Resilience can be defined in many ways, sometimes with respect to a physical attribute of a material, as a process, a personality trait, or even as a skill that can be mastered (Coutu, 2002; Cicchetti & Luthar, 2000; Meredith et al., 2011). Connor and Davidson describe resilience as a "multidimensional characteristic that varies with context, time, age, gender and cultural origin, as well as within an individual subjected to different life circumstances" (Connor & Davidson p.76, 2003). Masten likens resilience to the result of a very ordinary process where people are able to transform via "basic human adaptational systems" (2000, p. 227).

Luthar, Cicchetti and Becker (2000) warn against associating resilience as a personality trait because it could lead to the belief that some people simply do not possess the trait and will be unable to overcome hardships in life. If one feels that resilience belongs only to those with special attributes, then it might also lead to there being no attempt at interventions to assist in the development of resiliency (Luthar et al., 2000).

In this study, we use the Brief Resilience Scale (BRS) developed by Smith et al. (2008) to assess the self-reported resilience of recruits when they took surveys at four different time periods during boot camp. We use survey responses from time period two (T2) and time period four (T4) only. The Brief Resilience Scale determines "the ability to bounce back or recover from stress" (Smith et al., 2008, p. 194) and was initially tested on undergraduate students and medical patients with chronic pain or cardiac issues. The

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scale was intended to focus more on the ability to resist adversity and adapt or thrive in the face of it, rather than focusing on personality characteristics or protective factors that might enable someone to be more resistant to hardship (Smith et al., 2008). They further developed the scale as a means for assessing whether resilience is related to "important health outcomes" (Smith et al., 2008, p. 195) of participants, and if resources available to the participants were relevant.

I.   INDIVIDUAL RESILIENCE

Individual resilience refers to the ability of a person to overcome personal hardships or difficult situations and persist in spite of negative setbacks, and resilience can be developed or borne out of exposure to these hardships (Carver, 1998; Masten, 2001). Furthermore, resilience is a transformation of a person's character and is a direct result of the experiences with difficulty, and the capacity to move beyond adversity makes someone improved or more flexible because of it (Carver, 1998; Cicchetti & Luthar, 2000; Masten, 2001). Each person's experiences help shape their ability to withstand traumatic or troubling events that may come their way. The very exposure to these types of experiences is believed to be an exercise in character building, allowing someone to form a type of shield that protects them from the negative aspects of life and thrive in spite of them (Carver, 1998). Carver likens resilience gained through exposure to adversity to a child who gets chicken pox and later develops immunity to the disease after contracting the virus (Carver, 1998). Researchers have often attempted to identify ways to promote resilience in people, in hopes of being able to impart this skill to those in need of learning tools to deal with stressors.

Researchers believe that acquiring resiliency is more effective if individuals or groups experiencing harsh times have the opportunity to tap into resources for support, whether those resources are other people, or a more physical means to aid in their recovery (Masten, 2001, p. 228; Sutcliffe & Vogus, 2003 p. 9). For example, providing sailors with access to counselors or mentors whom they can discuss problems with or providing opportunities to learn skills such as resilience building and conflict resolution.

These types of resources help support the sailor and help them learn new techniques for coping and interpersonal relations.

Coutu (2000) suggests that resilient people share three qualities: the ability to accept reality (and not create a false one), a sense that life has meaning, and a talent for improvisation. In addition to a feeling that life is meaningful, these individuals also have a solid system of principles that helps deepen the importance of life (Coutu, 2000). The Navy Core Values that are taught in boot camp can serve as a foundation for instilling values in recruits. With such a diverse population that joins the Navy each year, the value sets of each recruit can vary widely.

J.   ORGANIZATIONAL/DIVISION RESILIENCE

Resilience is not limited only to individuals; it can be extended to groups of people and organizations as well. Organizational resilience is defined by Sutcliffe and Vogus (2003) as,

> (a) the ability to absorb strain and preserve (or improve) functioning despite the presence of adversity (both internal adversity—such as rapid change, lousy leadership, performance and production pressures and—external adversity—such as increasing competition and demands from stakeholders, or (b) an ability to recover or bounce back from untoward events. (p. 96)

Sutcliffe and Vogus (2003) further believe that resilience can be viewed from a developmental standpoint and that resilience in organizational units is a process that occurs over time in response to repeatedly handling stressful, risky, or difficult situations and that the ability to adjust positively in light of this difficulty builds a solid repository of resilience that can be called upon in future instances. Furthermore, "resilience is relative, emerging and changing in transaction with specific circumstances and challenges: resilience demonstrated in one situation may not be sustained over time or transferred to other circumstances or challenges" (Sutcliffe & Vogus, 2003, p. 97). However, if the unit possesses competence, then that is believed to carry over to other periods and make the unit or organization more capable of overcoming adversity (Sutcliffe & Vogus, 2003). Recurring themes can be seen in the literature that access to

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supportive resources and competence are treasure troves to be utilized in difficult times for those at risk.

Powley and Lopes (2011) focused on organizational resilience and identified four characteristics that resilient organizations possessed, "concerted leadership, adequate resources, enhancement of organizational learning, and flexibility/adaptability in the face of adversity" (p. 24). According to Powley and Lopes (2011), these characteristics "are necessary for organizational units to build resilience by enhancing the collective ability of the group to learn new skills, build collective efficacy, and positively adapt and adjust to change, challenging conditions, environments, and stressors over the long term" (p. 25). Powley and Lopes developed a tool to measure organizational resilience from these characteristics and this is the scale we used in our study to measure the resilience level of the divisions as a whole based on survey responses at T2 and T4 (Powley & Lopes, 2011).

Meredith et al. (2011) developed a framework for factors that have a positive effect on military member's resilience. The framework begins with the individual member at the center, and works outward to family members, then to other members in their military unit, and finally, their community (Meredith et al., 2011). The idea is that all of the factors surrounding a military member have the opportunity to be a source of strength and support for them during difficulty. Some factors may play a more influential role in combatting stress for a member dependent on their current situation. For example, while deployed, a member might rely more heavily on other members in their unit rather than family because of the physical proximity of their shipmates during a deployment. Members who have a strong network of people to support this framework will likely be better off than those who have not developed ties to those around them.

The Navy is made up of several types of organizational units depending on the location (whether it be shore unit or ship) where members are assigned. In the recruit training environment, the principal organizational unit is the division. The division members work, train, eat, and live together in an intense seven-week timeframe. During this period, recruits are able to learn about each other and from each other. They will be required to come together as a unit in order to excel. The environment in recruit training

is meant to be difficult in order to challenge recruits to learn to use the resources at their disposal, which sometimes comes from within, and other times can come from utilizing shipmates to help deal with stressors.

K.   USE OF INTERVENTIONS IN GROUPS

Research shows that some type of intervention or remediation has been helpful in developing or bolstering resilience capabilities in children and adults. Prior research by Challburg and Brown (2016), and Watling (2016) utilized three different appreciative inquiry intervention techniques for recruits during boot camp. These interventions consisted of statements of positive self-talk, divisional discussions led by Recruit Division Commanders (RDC), and researcher-led guided discussions among recruits to help them reflect on their experiences during boot camp (Challburg & Brown, 2016).

Because resilience can be learned, Cicchetti and Luthar (2000) propose that interventions used for people at risk can be helpful if it is geared toward improving developmental adjustment while reducing negative influences. Masten (2001) argues that interventions can be helpful to children if they are designed to increase the resources available to the child as a method of offsetting negative aspects in the child's life. Six out of eight of the recruit divisions in this study received an intervention to help promote resilience. The intervention format by Challburg and Brown (2016) and implemented positive affirmation, guided discussions focused on appreciative inquiry and feedback from the division's recruit division commanders (RDCs). A description of appreciative inquiry according to Cooperrider and Whitney (2001), as a process that "involves, in a central way, the art and practice of asking questions that strengthen a system's capacity to apprehend, anticipate, and heighten positive potential" (p. 7). The goal of this inquiry is to create a useful partnership between people, groups or entities so that they can be better versions of themselves (Cooperrider, Whitney, & Stavros, 2003).

The first intervention technique was intended to encourage recruits to identify positive statements that they could use to reflect back on during training at a period which they found difficult (Watling, 2016). The second intervention was a type of "post mortem" or after action report to review training events that had happened previously.

This was led by the RDCs and the members of the divisions were allowed to provide feedback and thoughts on how they felt the events went. This second intervention also incorporated the same positive statement technique used in the first intervention group (Watling, 2016). The third technique was a guided discussion for the recruits that began with a brief presentation "on resilience and the power of positive relationships" where "recruits were allowed to develop their own positive statements" and work together to help build unity within the division (Watling, 2016, p. 14). The third intervention was the most intensive technique because it allowed for the most interaction between researchers, RDCs, and recruit to recruit as well as personal reflection with recruits using positive self-statements.

Using appreciative inquiry during interventions with recruits provides them an opportunity to focus on positive aspects of their life and to question things they might not understand by exploring conceivable ways to deal with the new environment and other recruits. Appreciative inquiry is a useful tool used to promote change within people and organizations using discussion of the current state and a proposed path for the future state (Cooperrider et al., 2003). We hope that this type of intervention is helpful in building resilience in recruits so that they are able to conform to a new life in the Navy and are better equipped to cope with adversity.

Individuals as well as organizations possessing greater and deeper social connections will be more innovative and resilient (cf., Caza & Milton). In essence, if people are well connected and have beneficial resources at their disposal, they will be better equipped to deal with adverse conditions. Providing recruits with techniques to build resilience shows them how to utilize the resources that are available to them and help them see that they are never alone and have somewhere to turn when faced with adversity.

We have hope that the Navy will be able to utilize the research that has been conducted previously and apply those concepts to the Navy environment allowing for an improved force. It is with this in mind that we aim to discover if the availability of friendship networks and venting networks has bearing on the perceived resilience of the individual sailor and the division as a whole. We hope that there are links to social

networks and social capital that can be used in order to bolster resilience in recruits and help them to be the best person they can be for the good of the Navy.

Hypothesis 3:

a) Division recruits with higher measures of in degree and out degree and friendship and venting networks will have higher self-reported individual resiliency scores later. Additionally, those recruits receiving interventions will report higher resilience scores.

b) Division recruits who received interventions will have higher self-reported divisional (organizational) resilience.

L. SUMMARY

Several common threads pervade the present literature regarding resilience and provide a basis for examining social networks and the interactions that take place between actors in those networks. Scholars agree that resilience is the ability of someone or something to return to its original balance or state, whether mentally or physically, after experiencing trauma (Carver, 1998; Coutu, 2002; Cicchetti & Luthar, 2000; Meredith et, al., 2011; Sutcliffe & Vogus, 2003). Furthermore, most scholars agree that resilience is something that can be learned and applied to a stressful life situation when needed (Carver, 1998; Coutu, 2002; Masten, 2001).

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III. METHODOLOGY

A. INTRODUCTION

This project continues research from surveys conducted with boot camp recruits in 2015 by Challburg and Brown. Surveys were conducted with eight divisions, labeled D1 through D8 in this paper, and at four different time periods which occurred during week two, week four, week six, and week seven, labeled T1, T2, T3, and T4 in this paper, of the seven weeks at boot camp. Following the T2 survey, an intervention was conducted with six of the eight divisions. Divisions D1 and D2 received no intervention and are considered the control group. Divisions D3 and D4 received Intervention 1, consisting of positive self-talk exercises aimed at building individual resilience based on experiences at boot camp. Divisions D5 and D6 received Intervention 2, which consisted of an RDC-led after-action debrief following a group exercise focused on individual and group performance. Divisions D7 and D8 received Intervention 3 consisting of guided conversations focused on increasing both individual and division resilience. Brief descriptions of the different interventions are shown in Table 1. A detailed description of the interventions used can be found in Brown and Challburg's (2016) thesis titled "Resilience among Naval Recruits." Additionally, four divisions were comprised of male and female recruits being integrated, while the other four did not. Integrated divisions were spread among the different interventions so that each intervention group was made up of an integrated division and a non-integrated division. The divisions, the interventions they received, a description of the interventions, and whether or not they were integrated are shown in Table 2 Divisions and Interventions.

Table 1.   Description of Interventions. Adapted from Challburg and Brown (2016).

Intervention 1	Positive Self-Talk Exercises consisting of "I am," "I can," or "I will" statements developed by each recruit who received the intervention allowed them to reflect on their current identify and then focus on future obstacles and ways to overcome stressful situations in order to develop individual resilience.
Intervention 2	Consisted of the same Positive Self-Talk Exercises in Intervention 1 combined with RDC Guided After-Action Debriefs that included feedback from an activity and group discussion on how the division may perform better as a team to increase divisional resilience.
Intervention 3	Guided Conversations Between Recruits was conducted in a closed environment and included a brief on resiliency and positive relationships followed by semi-guided discussion between recruits to increase individual and divisional resilience.

Table 2.   Divisions and Interventions

Division	Intervention	Description	Integrated
D1	No Intervention	Control Group	Yes
D2	No Intervention	Control Group	No
D3	Intervention 1	Positive Self-Talk Exercises	No
D4	Intervention 1	Positive Self-Talk Exercises	Yes
D5	Intervention 2	Positive Self-Talk Exercises and RDC Guided After-Action Debriefs	Yes
D6	Intervention 2	Positive Self-Talk Exercises and RDC Guided After-Action Debriefs	No
D7	Intervention 3	Guided Conversations Between Recruits	No
D8	Intervention 3	Guided Conversations Between Recruits	Yes

B.   SURVEY SAMPLE

Recruits from all eight divisions received identical surveys at the four different time periods. However, for the scope of this project, we will focus on survey results from the eight divisions at T2 and T4. After T2, 520 completed surveys were collected from a possible 649 recruits resulting in an 80 percent response rate, while 545 completed surveys were collected after T4 out of 602 possible respondents, producing a 91 percent

response rate. Response rates by division for T2 and T4 surveys are listed in Tables 3 and 4, respectively.

Table 3.   T2 Response Rates

Division	Number of Respondents	Recruits in Division	Response Rate
Control Group D1	57	79	72%
Control Group D2	65	77	84%
Intervention 1 D3	60	81	74%
Intervention 1 D4	65	88	74%
Intervention 2 D5	72	85	85%
Intervention 2 D6	61	78	78%
Intervention 3 D7	67	77	87%
Intervention 3 D8	73	84	87%
Totals	520	649	80%

Table 4.   T4 Response Rates.

Division	Number of Respondents	Recruits in Division	Response Rate
Control Group D1	69	79	87%
Control Group D2	70	75	93%
Intervention 1 D3	68	76	89%
Intervention 1 D4	68	78	87%
Intervention 2 D5	73	80	91%
Intervention 2 D6	70	73	96%
Intervention 3 D7	57	70	81%
Intervention 3 D8	70	71	99%
Totals	545	602	91%

C. FRIENDSHIP AND VENTING NETWORKS

Each survey contained a list of all recruits within their respective divisions and respondents were asked to place a check mark next to the listed recruits when answering the following questions:

- Mark those persons you consider to be your friends.

- With which individual have you shared your frustrations, challenges, complaints, or just want to let off steam?

The data was input into spreadsheet with a number 1 representing a check mark in the friendship or venting column and a zero representing no marked connection. The spreadsheets were then adjacently adjusted to have an equal number of columns and rows to produce a binary matrix. The matrices were then loaded into UCINET to measure density, reciprocity, and centrality of both friendship and venting networks for each division at T2 and T4, and ran a Quadratic Assignment Procedure (QAP) Correlation between friendship and venting networks at T2 and T4 for all divisions:

- Density measures the proportion of ties present in the network in comparison to all possible ties.

- Reciprocity is the percentage of those ties measured by density that are mutually shared between actors in the network.

- Centrality consists of two measures, in-degree and out degree. In-degree measures the number of connections an actor receives in a network and out-degree measures the number of outgoing ties associated with an actor.

- The QAP correlation compares two networks containing the same set of actors and measures the probability that a tie in one network will correspond to a tie in the second network. (Borgatti, Everett, & Johnson, 2013).

We also utilized UCINET software to create a visual representation of the friendship network and venting network for each division, both at T2 and T4. Network images are listed in the Appendix. Within the network images yellow circles represent female recruits, blue squares represent male recruits, red lines represent a reciprocated connection between recruits and blue lines represent a one-way connection between recruits.

D. COHESION AND PSYCHOLOGICAL SAFETY MEASURES

The self-reported cohesion portion of the survey consisted of recruits responding to 17 statements, seven concerning divisional cohesion, five concerning task cohesion, and five concerning social cohesion (Beal, Cohen, Burke, & McLendon, 2003). The following statements are examples of items that were used to measure self-reported cohesion:

- Our Division is well coordinated.

- Our Division is unified in its task focus.

- Our Division members get along well with each other. (Beal et al., 2003, p. 995).

The survey utilizes a seven-point Likert Scale with higher scores being associated with favorable responses. Recruit scores across the 17 items were averaged to give each recruit a self-reported cohesion score. Scores were then input into a cohesion matrix that corresponded with network matrices at T4 and scores were multiplied between actors (i.e., if actor "A" had an average cohesion score of 6 and actor "B" had an average cohesion score of 7, then their relational cohesion score would be 42). A QAP correlation was ran between relational cohesion scores at T2 and both friendship and venting networks at T4 to determine if higher relational scores early in boot camp correlate to a network connection later.

The psychological safety portion of the survey contained six items that were derived from a survey used in the study of Psychological Safety and Learning Behavior in Work Teams (Edmondson, 1999). The following items are examples of statements on the psychological safety portion of the survey:

- Members of this division value and respect each other's contributions.

- In this division, it is easy to discuss difficult issues and problems.

- It is completion safe to take a risk in this division. (Edmonson, 1999, p. 382)

On the same seven-point Likert scale, three questions had higher scores associated with favorable answers while three negatively framed items had lower scores associated with

favorable responses. The scores from the negatively framed items were then reversed so that all higher scores represented favorable responses. Recruits scores across the six items were averaged to give each recruit a self-reported psychological safety score. Scores were then input into a psychological safety matrix that corresponded with network matrices at T4 and scores were added between actors (i.e., if actor "A" had an average psychological safety score of 6 and actor "B" had an average psychological safety score of 7, then their relational psychological safety score would be 13). These relational psychological safety scores at T2 were then compared to the friendship and venting networks at T4 to determine if higher relational scores early in boot camp correlate to a network connection later. Additionally, we ran a correlation between T2 cohesion and psychological safety scores from recruits in all divisions with individual T4 friendship and venting network measures of out-degree and in-degree.

E.   INDIVIDUAL AND DIVISION RESILIENCE MEASURES

Individual resilience measures were achieved using the Brief Resilience Scale consisting of six items (Smith et al., 2008). The following are examples of the statements intended to assess the ability of boot camp recruits to recover or bounce back from stressful events:

- I tend to bounce back quickly after hard times.

- I have a hard time making it through stressful events.

- I tend to take a long time to get over set-backs in my life. (Smith et al., 2008, p. 196).

Utilizing a seven-point Likert scale, three of the individual resilience items were positively framed with higher scores indicating favorable responses and the other three items were negatively framed with lower scores representing favorable responses. The scores from the negatively framed items were reversed and then all six items were averaged to produce a single individual resiliency score for each recruit.

We then ran a regression analysis with recruits from all eight divisions using recruits' T4 individual resilience scores as the dependent variable and the following independent variables: gender, age, Armed Forces Qualification Test score (AFQT),

Interventions 1, 2 and 3, T2 psychological safety score, T2 friendship network out-degree centrality measure, T2 friendship network in-degree centrality measure, T2 divisional resilience score, and T2 individual resilience score to produce the following model:

Individual Resilience$_{T4}$ = Gender + Age + AFQT + Intervention$_1$ + Intervention$_2$ + Intervention$_3$ + Psychological Safety Score$_{T2}$ + Friendship Network Out-Degree$_{T2}$ + Friendship Network In-Degree$_{T2}$ + Divisional Resilience$_{T2}$ + Individual Resilience$_{T2}$.

Division resilience was measured using 14 questions to assess how boot camp recruits identify the ability of their division co-members to work as a team and support one another in order to accomplish difficult tasks. The survey questions were adapted from research into small unit resilience and focused on four characteristics of their associated resilience: "concerted leadership, adequate resources, enhancement of organizational learning, and flexibility/adaptability in the face of adversity" (Powley & Lopes, 2011, p. 24). Examples of the divisional resilience items contained in the survey are:

- We recover from challenges that affect our day-to-day operations.

- We turn toward each other for support and help.

- We push forward despite setbacks. (Powley & Lopes, 2011, p. 32)

The questions were answered using a seven-point Likert scale with higher scores representing favorable responses. The scores to the 14 questions were then averaged producing and overall self-identified divisional resilience score for each recruit.

We then ran a regression analysis with recruits from all eight divisions using recruits T4 divisional resilience scores as the dependent variable and the following independent variables: gender, age, Armed Forces Qualification Test score (AFQT), Interventions 1, 2 and 3, T2 cohesion score, T2 psychological safety score, T2 friendship network out-degree, and T2 venting network in-degree producing the following model:

Divisional Resilience$_{T4}$ = Gender + Age + AFQT + Intervention$_1$ + Intervention$_2$ + Intervention$_3$ + Cohesion Score$_{T2}$ + Psychological Safety Score$_{T2}$ + Friendship Network Out-Degree$_{T2}$ + Venting Network In-Degree$_{T2}$.

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IV. RESULTS

A. INTRODUCTION

As discussed in Chapter III, measures used to analyze and compare both friendship and venting networks from all eight divisions include density, reciprocity, and QAP correlation utilizing UCINET software. Network values from UCINET for the three measures at T2 and T4 were then compared and ranked accordingly to identify patterns or relationships among divisions and within intervention groups. We also attempted to identify correlations between T2 cohesion and psychological safety of each division and their corresponding T4 network connections and network measures. Lastly we explored any predictability of T2 recruit attributes and interventions with T4 friendship and network measures.

B. FRIENDSHIP AND VENTING NETWORK MEASURES

Density measures the number of network connections reported in the surveys as a percentage of the total of number possible connections within the network. Reciprocity is the percentage of those ties measured by density that are mutually shared between actors in the network. The QAP correlation compares two networks containing the same set of actors and measures the probability that a tie in one network will correspond to a tie in the second network. In hypothesis 1.a., we hypothesized that the divisions who received interventions will display higher T4 friendship and venting network scores of density and reciprocity. We also hypothesized, hypothesis 1.b., that there is a positive correlation between friendship and venting networks and that those divisions who received interventions would have a higher correlation between their networks.

1. Density of Friendship Networks

Density measures were ranked one through eight, strongest to weakest, at both T2 and T4 for comparison. The division with the lowest density at T2 was Division 5 at

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0.161; however, there was a slight increase in density to 0.185 at T4. Division 3 had the highest density at T2 with 0.282 but experienced a slight decrease to 0.226 at T4, though it remained top ranked among all divisions for density. At T4, Division 6 had the highest density at 0.293 increasing from 0.255 at T2. Division 2 had the lowest density at T4 decreasing to 0.104 from 0.219 at T2. Friendship network density values and division rankings are shown in Table 5.

Table 5.   Friendship Network Density Values and Ranking.

Division	T2 Density	Rank at T2	T4 Density	Rank at T4
Control Group D1	0.241	4	0.224	3
Control Group D2	0.219	5	0.104	8
Intervention 1 D3	0.282	1	0.226	2
Intervention 1 D4	0.196	6	0.115	7
Intervention 2 D5	0.161	8	0.185	5
Intervention 2 D6	0.255	2	0.293	1
Intervention 3 D7	0.246	3	0.209	4
Intervention 3 D8	0.172	7	0.166	6

Overall, six divisions experienced a decrease in density and two divisions experienced an increase in density. The most improved density was within Division 6, increasing from 0.255 at T2 to 0.293 at T4, while highest decline in density was Division 2, falling from 0.219 at T2 to 0.104. A graphical representation of density values at T2 and T4 is shown in Figure 4.

Friendship Network Density
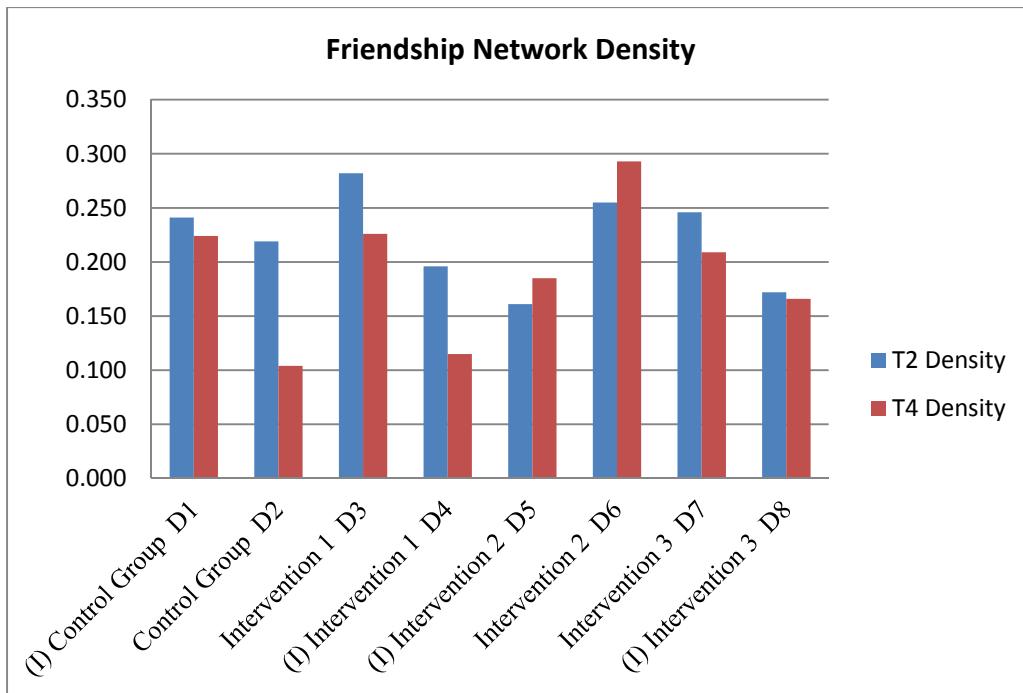
(I) Indicates Integrated Division.

Figure 4. Friendship Network Density Values.

Both divisions who had an increase in density, Divisions 5 and 6, had received Intervention 2. Divisions 1 and 2, the control groups whose recruits did not receive an intervention, experienced decreases in density, with Division 1 having a slight decrease and Division 2 experiencing a larger decrease. Divisions 3 and 4, who received Intervention 1, both experienced approximately the same amount of moderate decrease in density. Divisions 7 and 8, who received Intervention 3, also experienced decreases in density, with Division 7 having a moderate decrease and Division 8 a slight decrease. Of the integrated divisions, D5 experienced an increase in friendship network density while the other three had a decrease. The non-integrated divisions had the same outcome, with D6 showing the only increase and the remaining three showing decreasing friendship network density values. These results dispute hypothesis 1.a.

2.   Density of Venting Networks

Density measures were ranked one through eight, strongest to weakest, at both T2 and T4 for comparison. At T2, Division 1 had the highest density at 0.127 while Division 6 had the lowest at 0.087, closely followed by Division 7 at 0.092. Division 3 had the highest density at T4 increasing from 0.119 to 0.147 and Division 2 had the lowest, decreasing to 0.037 from 0.102 at T2. Venting network density values and division rankings are shown in Table 6.

Table 6.   Venting Network Density Values and Ranking.

Division	T2 Density	Rank at T2	T4 Density	Rank at T4
Control Group D1	0.127	1	0.140	2
Control Group D2	0.102	5	0.037	8
Intervention 1 D3	0.119	2	0.147	1
Intervention 1 D4	0.107	4	0.061	7
Intervention 2 D5	0.093	6	0.128	3
Intervention 2 D6	0.087	8	0.155	4
Intervention 3 D7	0.117	3	0.126	5
Intervention 3 D8	0.092	7	0.096	6

Overall, six divisions experienced an increase in density and two divisions experienced a decrease in venting network density measures from T2 to T4. The most improved density was in Division 6, increasing to 0.155 at T4 from 0.087 at T2 and largest decrease in density was Division 2, dropping to 0.037 at T4 from 0.102 at T2. Venting network density values for all divisions at T2 and T4 are shown in Figure 5.

Venting Network Density
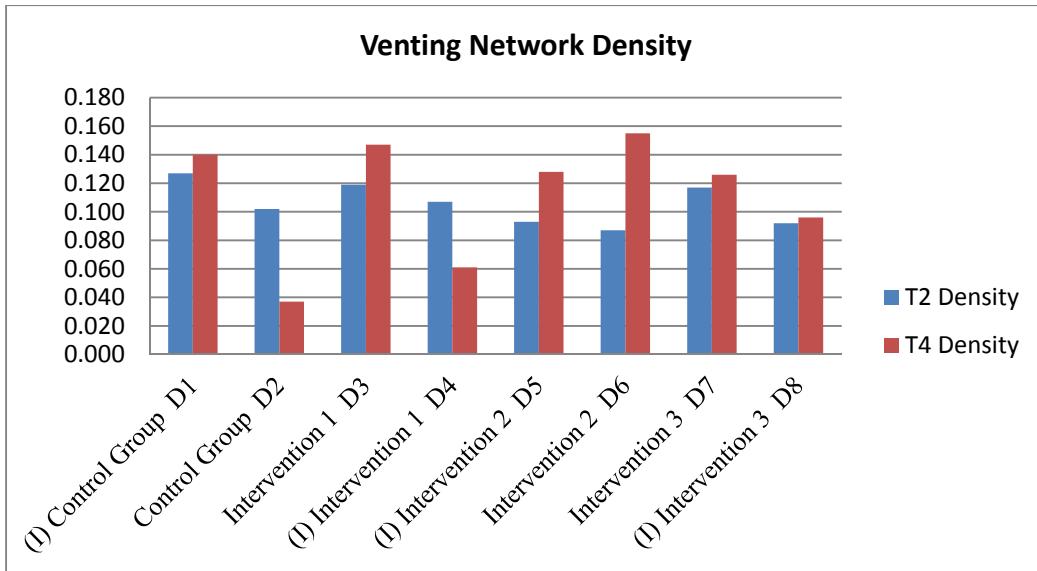
(I) Indicates Integrated Division.

Figure 5. Venting Network Density Values.

The two divisions who showed a decrease in venting network density were Division 2, a control group who did not receive an intervention, and Division 4, whose recruits received Intervention 1. Divisions 5 and 6 received Intervention 2 and both divisions experienced moderate increases in venting network density from T2 to T4. Divisions 7 and 8, who received Intervention 3, both experienced slight increases in venting network density. Looking at integrated divisions, D4 had a decrease in venting network density while the other three had an increase. D2 was the only non-integrated division to experience a decrease in venting network density, while the other three had increases. Venting network density results support hypothesis 1.a.

3. Reciprocity of Friendship Networks

Reciprocity measures were ranked one through eight, strongest to weakest, at both T2 and T4 for comparison. D1 ranked highest in reciprocity at both T2 and T4, though there was a decline in reciprocity between T2 and T4 dropping from 0.467 to 0.425. D7 had the lowest reciprocity at T2 with 0.278 but increased to 0.370 at T4. D4 had the lowest reciprocity at T4 decreasing from 0.318 to 0.181. Division friendship network reciprocity values and rankings are shown in Table 7.

Table 7. Friendship Network Reciprocity Values and Ranking

Division	T2 Reciprocity	Rank at T2	T4 Reciprocity	Rank at T4
Control Group D1	0.467	1	0.425	1
Control Group D2	0.350	5	0.184	7
Intervention 1 D3	0.348	6	0.359	5
Intervention 1 D4	0.318	7	0.181	8
Intervention 2 D5	0.359	4	0.387	2
Intervention 2 D6	0.382	3	0.360	4
Intervention 3 D7	0.278	8	0.370	3
Intervention 3 D8	0.385	2	0.331	6

Overall, five divisions had a decreases in friendship network reciprocity values from T2 to T4, while three experienced increases. D2 displayed the largest decrease in friendship network reciprocity falling from 0.350 at T2 to 0.184 at T4. D7 had the largest increase in reciprocity increasing from 0.278 at T2 to 0.370 at T4. Figure 6 displays a graphical representation of reciprocity values at T2 and T4 for all eight divisions.
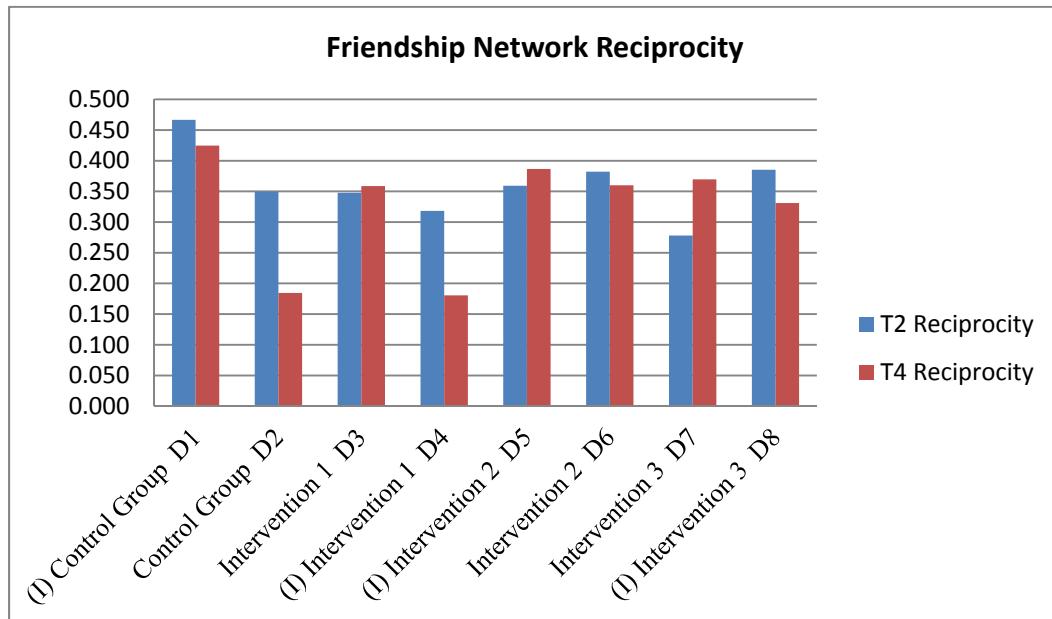
(I) Indicates Integrated Division.

Figure 6. Friendship Network Reciprocity Values.

D1 and D2, the control groups, both decreased; however, the other intervention groups were split with one division experiencing a decrease while the other had an increase in reciprocity. D3, D5 and D7 had increases in reciprocity between T2 and T4 while D4, D6 and D8 had decreases. D5 was also the only integrated division to experience an increase in friendship network reciprocity while the other three integrated divisions, D1, D4, and D8 had decreasing reciprocity values. The non-integrated divisions were split, with D2 and D6 having a decrease and D3 and D7 showing increases in friendship network reciprocity. These results dispute 1.a.

### 4.   Reciprocity of Venting Networks

Reciprocity measures were ranked one through eight, strongest to weakest, at both T2 and T4 for comparison. Venting network reciprocity rankings are similar to those of the friendship networks with D1 ranking the highest at T2 with 0.311 and D7 ranking the lowest at 0.178. D2 also experienced a significant decrease in venting network reciprocity dropping from 0.253 at T2 to 0.059 at T4, as did D4 decreasing from 0.236 at T2 to 0.122 at T4. D3 maintained the same reciprocity score at T2 and T4 with 0.225. Venting network reciprocity values and divisional rankings at T2 and T4 are shown in Table 8.

Table 8.   Venting Network Reciprocity Values and Ranking

Division	T2 Reciprocity	Rank at T2	T4 Reciprocity	Rank at T4
Control Group D1	0.311	1	0.277	4
Control Group D2	0.253	4	0.059	8
Intervention 1 D3	0.225	6	0.225	5
Intervention 1 D4	0.236	5	0.122	7
Intervention 2 D5	0.309	3	0.304	2
Intervention 2 D6	0.212	7	0.203	6
Intervention 3 D7	0.178	8	0.319	1
Intervention 3 D8	0.310	2	0.288	3

Overall, six divisions showed a decrease in venting network reciprocity, one division remained the same, and one division had an increase. D2 experienced the largest decrease in venting network reciprocity dropping a significant amount from 0.253 at T2

to 0.059 at T4. D7 had the largest increase in reciprocity, rising from 0.178 at T2 to 0.319 at T4. Figure 7 displays a graphical representation of venting network reciprocity values at T2 and T4 for all eight divisions.
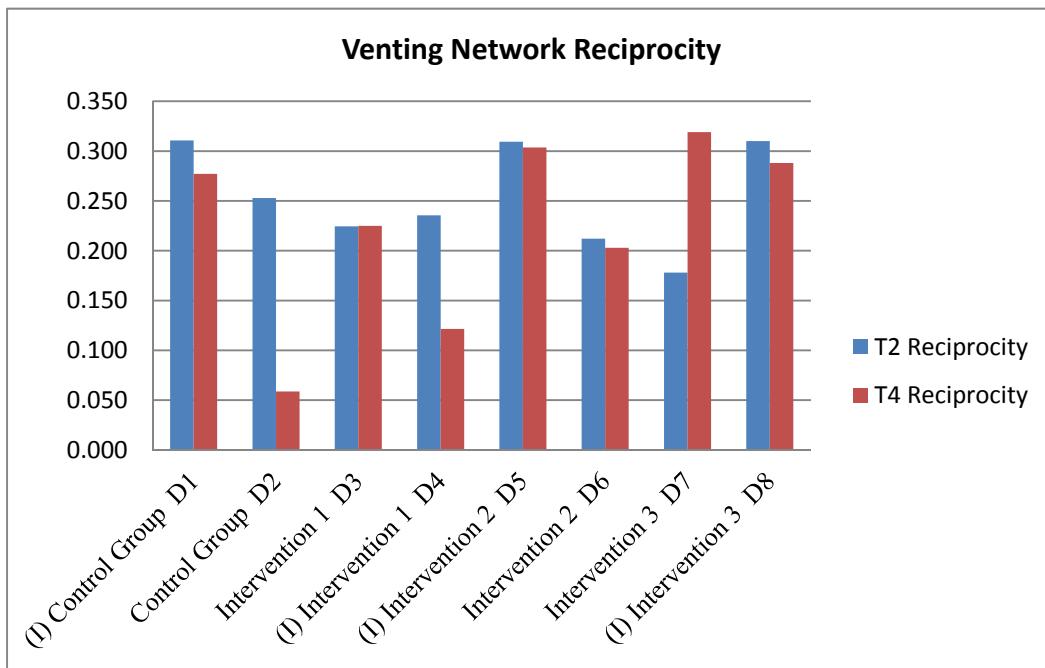
(I) Indicates Integrated Division.

Figure 7.   Venting Network Reciprocity Values.

Venting network reciprocity decreased from T2 to T4 for both D1 and D2 in the control group, and D5 and D6 who both received Intervention 2. Intervention 1 divisions' D3 reciprocity remained the same while D4 had a significant decrease. D7 had a significant increase in venting network reciprocity from T2 to T4, while D8 had a slight decrease, both divisions who received Intervention 3. Additionally, all four integrated divisions had a decrease in venting network reciprocity as well as two non-integrated divisions. Non-integrated divisions D3 maintained the same reciprocity value from T2 to T4 and D7 had a significant increase in venting network reciprocity. These results support hypothesis 1.a.

5.   QAP Correlation between Friendship and Venting Networks

The QAP correlation function in UCINET compares two networks containing the same set of actors and measures the probability that a tie in one network will correspond to a tie in the second network. D4 had the highest QAP correlation between friendship and venting networks at T2 with 0.623 but decreased to 0.606 at T4. D6 had the lowest correlation at T2 with 0.449 and increased to 0.582 at T4. D7 had the highest correlation at T4 increasing to 0.679 from 0.538 at T2 and D2 had the lowest correlation at T4 decreasing to 0.521 from 0.542 at T2. Divisional rankings and QAP correlation values between friendship and venting networks at T2 and T4 are listed in Table 9.

Table 9.   Friendship and Venting Network QAP Correlation Scores.

Division	T2 Friendship and Venting Network QAP Correlation	Rank at T2	T4 Friendship and Venting Network QAP Correlation	Rank at T4
Control Group D1	0.575	2	0.627	5
Control Group D2	0.542	5	0.521	8
Intervention 1 D3	0.488	7	0.644	3
Intervention 1 D4	0.623	1	0.606	6
Intervention 2 D5	0.569	4	0.662	3
Intervention 2 D6	0.449	8	0.582	7
Intervention 3 D7	0.538	6	0.679	1
Intervention 3 D8	0.572	3	0.638	4

Overall, six divisions experienced an increase in correlation between friendship and venting networks while two divisions showed a decrease. D3 had the highest increase in correlation, growing from 0.488 at T2 to 0.644 at T4, while D2 decreased from 0.542 at T2 to 0.521 at T4 experiencing the biggest (although slight) decrease. A visual representation of the QAP correlation values at T2 and T4 for all division is shown in Figure 8.
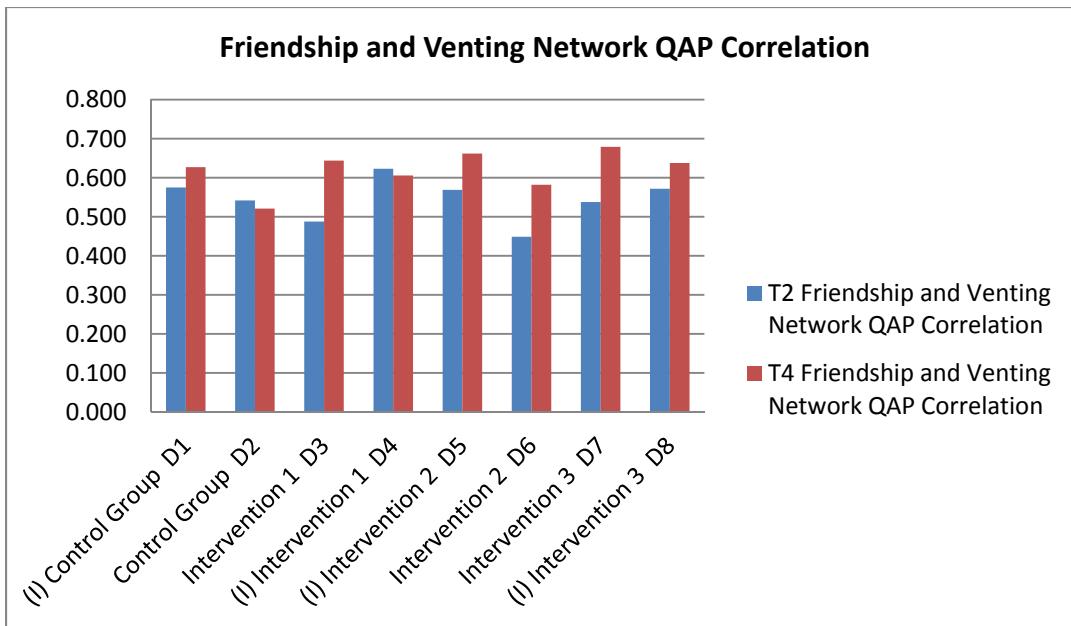
Figure 8. Friendship and Venting Network QAP Correlation Scores.

(I) Indicates Integrated Division.

Both divisions who received Intervention 2 and both divisions who received Intervention 3 experienced increases in QAP correlation between friendship and venting networks from T2 to T4. The control groups, D1 and D2, as well as Intervention 1 divisions D3 and D4, were split with one division having an increase in correlation and the other a decrease. These results support hypothesis 1.b.

D2 and D4 experienced the largest decrease in density and reciprocity for both the friendship and venting networks from T2 to T4, and were the only two divisions to experience a decrease in QAP Correlation from T2 to T4 between friendship and venting networks. The T4 surveys were administered to D2 and D4 immediately after battle stations, which is the final testing phase and a culmination of what has been learned in boot camp. It is an emotionally and physically exhausting activity and due to the timing of the T4 survey for D2 and D4 we assume that both divisions were fatigued and sleep deprived which affected survey results.

Excluding D2 and D4 results, hypothesis 1.a., divisions who received interventions will display higher T4 scores of density and reciprocity appears to be true for venting network density and reciprocity, but not for friendship network density and reciprocity. Hypothesis 1b, there is a positive correlation between friendship and venting networks and that those divisions who received interventions would have a higher correlation between their networks, is supported by the results as well.

C. COHESION AND PSYCHOLOGICAL SAFETY

Utilizing UCINET software we ran a QAP Correlation between the T2 cohesion relational score matrix and both T4 friendship and venting network matrices for each division. We also ran a QAP Correlation between the T2 psychological safety score matrix and both T4 friendship and venting network matrices for each division. Additionally, we ran a correlation between T2 cohesion and psychological safety scores from recruits in all divisions with individual T4 friendship and venting network measures of out-degree and in-degree. We hypothesized that higher relational cohesion scores between recruits at T2 will correlate to a tie in the friendship network at T4 in hypothesis 2.a., and that higher relational psychological safety scores between recruits at T2 will correlate to a tie in the venting network at T4 in hypothesis 2.b.

Correlation measures for each division are shown in Tables 10 through 13. Divisions D1 and D2 that make up the control group are shown in Table 10. Divisions D3 and D4 who received Intervention 1 are shown in Table 11. Divisions D5 and D6 that received Intervention 2 are shown in Table 12, and divisions D7 and D8 that received Intervention 3 are shown in Table 13.

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Table 10. QAP Correlation Measures for Control Group Divisions D1 and D2.

	Control Group			
	D1	D1	D2	D2
	T4 Friendship Network	T4 Venting Network	T4 Friendship Network	T4 Venting Network
T2 Cohesion				
Correlation	0.1040	0.0700	0.0345	0.0172
Standard Deviation	0.0371	0.0346	0.0342	0.0272
P-Value	0.0024	0.0156	0.1514	0.2657
T2 Psychological Safety				
Correlation	0.1048	0.0759	0.0087	-0.0012
Standard Deviation	0.0375	0.0350	0.0342	0.0274
P-Value	0.0028	0.0096	0.3945	0.4783

Table 11. QAP Correlation Measures for Intervention 1 Divisions D3 and D4.

	Intervention 1			
	D3	D3	D4	D4
	T4 Friendship Network	T4 Venting Network	T4 Friendship Network	T4 Venting Network
T2 Cohesion				
Correlation	0.0087	0.0277	0.0473	0.0463
Standard Deviation	0.0431	0.0415	0.0342	0.0298
P-Value	0.4189	0.2523	0.0868	0.0588
T2 Psychological Safety				
Correlation	-0.0066	0.0041	0.0464	0.0383
Standard Deviation	0.0375	0.0360	0.0345	0.0299
P-Value	0.4355	0.4363	0.0892	0.1008

Table 12. QAP Correlation Measures for Intervention 2 Divisions D5 and D6.

	Intervention 2			
	D5	D5	D6	D6
	T4 Friendship Network	T4 Venting Network	T4 Friendship Network	T4 Venting Network
T2 Cohesion				
Correlation	-0.0247	-0.0336	0.0152	0.0002
Standard Deviation	0.0344	0.0300	0.0491	0.0415
P-Value	0.2484	0.1396	0.3863	0.5009
T2 Psychological Safety				
Correlation	0.0045	0.0043	-0.0011	-0.0149
Standard Deviation	0.0285	0.0250	0.0502	0.0423
P-Value	0.4277	0.4215	0.4857	0.3587

Table 13. QAP Correlation Measures for Intervention 3 Divisions D7 and D8.

	Intervention 3			
	D7	D7	D8	D8
	T4 Friendship Network	T4 Venting Network	T4 Friendship Network	T4 Venting Network
T2 Cohesion				
Correlation	-0.0106	0.0126	-0.0465	-0.0448
Standard Deviation	0.0444	0.0371	0.0426	0.0318
P-Value	0.4107	0.3719	0.1304	0.0788
T2 Psychological Safety				
Correlation	-0.0324	-0.0034	-0.0373	-0.0208
Standard Deviation	0.0444	0.0371	0.0433	0.0322
P-Value	0.2344	0.4663	0.1872	0.2458

While D1 measures indicate a statistically significant but extremely small correlation between the T2 cohesion matrix and T4 friendship and venting network matrices, and the T2 psychological safety matrix and T4 friendship and venting network matrices, it is the only division that produced those results. Also, there appears to be no difference among intervention groups or integrated divisions. Results of the correlation indicate that relational cohesion and psychological safety scores at T2 are not useful tools

to predict friendship network and/or venting network ties at T4. These results lead us to reject our hypothesis 2.a. and 2.b., that higher relational cohesion and psychological safety scores between recruits at T2 will correlate to a tie in the friendship or venting network at T4.

Results from the correlation between T2 cohesion and psychological safety scores from recruits in all divisions with individual T4 friendship and venting network measures of out-degree and in-degree are shown in Table 14.

Table 14.   Correlation Measures All Divisions

	T2 Cohesion	T2 Psych Safety	T4 Friendship Out-degree	T4 Friendship In-degree	T4 Venting Out-degree	T4 Venting In-degree
T2 Cohesion	1					
T2 Psych Safety	0.667	1				
T4 Friendship Out-degree	0.041	0.039	1			
T4 Friendship In-degree	0.025	0.058	0.420	1		
T4 Venting Out-degree	0.018	0.009	0.640	0.293	1	
T4 Venting In-degree	0.002	0.021	0.393	0.853	0.296	1

There appears to be no correlation between T2 cohesion and psychological safety scores with individual T4 friendship and venting network measures of out-degree and in-degree. We did discover that there is a statistically significant (p-value 0.001) and strong correlation (0.667) between cohesion and psychological safety measures at T2.

D.   INDIVIDUAL AND DIVISION RESILIENCE

Our third hypothesis suggested that T2 individual attributes, such as higher measures of in-degree and out-degree within the friendship and venting networks will

predict higher individual and divisional resiliency scores at T4. Additionally, those recruits receiving interventions will report higher T4 resiliency scores compared to the control group.

The regression analysis conducted on individual resilience scores at T4 utilized the following model:

Individual Resilience$_{T4}$ = Gender + Age + AFQT + Intervention$_1$ + Intervention$_2$ + Intervention$_3$ + Psychological Safety Score$_{T2}$ + Friendship Network Out-Degree$_{T2}$ + Friendship Network In-Degree$_{T2}$ + Divisional Resilience$_{T2}$ + Individual Resiliencet$_{T2}$.

Results of the regression analysis are shown in Table 15. The regression conducted using individual resilience as the dependent variable shows that the independent variable Intervention 3 is statistically significant with a p-value of 0.007 and can increase individual resilience by 0.321 units. The independent variable psychological safety is also statistically significant with a p-value of 0.011 but is negatively correlated and can decrease individual resilience by 0.110 units.

Table 15. T4 Individual Resilience Regression Analysis.

T4 Individual Resilience–Dependent Variable			
R Square	0.3329		
Observations	430		
Independent Variables	Coefficients	Standard Error	P-Value
Intercept	1.9082	0.4597	0.0000
Gender	-0.0863	0.1034	0.4044
Age	0.0051	0.0142	0.7189
AFQT	0.0041	0.0027	0.1197
Intervention 1	-0.0245	0.1190	0.8369
Intervention 2	0.2051	0.1188	0.0849
Intervention 3	0.3262	0.1184	0.0061
T2 Psychological Safety	-0.1094	0.0432	0.0117
T2 Friendship Network In-Degree	-0.0032	0.0045	0.4736
T2 Venting Network Out-Degree	0.0081	0.0073	0.2734
T2 Divisional Resilience	0.0844	0.0529	0.1113
T2 Individual Resilience	0.5718	0.0453	0.0000

The regression analysis conducted with divisional resilience scores at T4 as the dependent variable utilized the following model:

Divisional Resilience$_{T4}$ = Gender + Age + AFQT + Intervention$_1$ + Intervention$_2$ + Intervention$_3$ + Cohesion Score$_{T2}$ + Psychological Safety Score$_{T2}$ + Friendship Network Out-Degree$_{T2}$ + Venting Network In-Degree$_{T2}$.

Results of the regression analysis are shown in Table 16 and the following independent variables proved to statistically significant: Intervention 1, Intervention 2, cohesion, psychological safety, and friendship network out-degree. Intervention 1 had a p-value of 0.016 but was negatively correlated and can decrease divisional resilience by 0.306 units. Intervention 2 had a p-value of 0.002 and can increase divisional resilience by 0.382 units. Cohesion measures at T2 had a p-value of 0.000 and can increase divisional resilience by 0.262 units. Psychological safety values at T2 had a p-value of 0.049 and can increase divisional resilience by 0.111 units. Lastly, friendship network –out-degree at T2 had a p-value of 0.012 and can increase divisional resilience by 0.012 units.

Table 16. T4 Divisional Resilience Regression Analysis.

T4 Divisional Resilience –Dependent Variable			
R Square	0.2036		
Observations	433		
Independent Variables	Coefficients	Standard Error	P-Value
Intercept	3.3954	0.4248	0.0000
Gender	-0.0699	0.1032	0.4986
Age	0.0126	0.0150	0.4014
AFQT	0.0001	0.0028	0.9638
Intervention 1	-0.3060	0.1265	0.0160
Intervention 2	0.3817	0.1250	0.0024
Intervention 3	-0.0673	0.1265	0.5949
T2 Cohesion	0.2624	0.0599	0.0000
T2 Psychological Safety	0.1110	0.0563	0.0491
T2 Friendship Network Out-Degree	0.0116	0.0046	0.0123
T2 Venting Network In-Degree	-0.0179	0.0117	0.1277

The results confirm portions of hypothesis 3.a., the T2 friendship network measure of out-degree is a good predictor of divisional resilience at T4. However, T2 network measures were not good predictors for T4 individual resilience. Among the interventions, our regression models indicate that Intervention 3 was a good predictor of individual resilience and that Intervention 2 was a good predictor of divisional resilience. Additionally, Intervention 1 was statistically significant for divisional resilience but had a negative relation.

E.   SUMMARY

The results of our data analysis indicate that there is a positive relationship between friendship and venting networks amongst boot camp recruits. Those individuals identified by recruits as friends were also likely to be identified as individuals with whom recruits could vent to. Resiliency interventions administered to boot camp recruits also contributed to higher density and reciprocity scores in venting networks. Also, divisions who received interventions were more likely to have an increased number of venting network connections and more of those connections were found to be mutual. Lastly, resiliency interventions administered early in boot camp contributed to higher divisional and individual resiliency scores over time.

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V.   CONCLUSION

A.   PURPOSE

The purpose of this project is to further explore resilience research done by Burt and Barr (2015), Challburg and Brown (2016), and Watling (2016). The aforementioned studies focused on resilience, interventions, and social networks of Naval recruits while using the additional factors of leadership and positive framing. We focused our research on friendship and venting networks, and how they related to cohesion and psychological safety scores at the individual and organizational level. Our three hypotheses had both positive and negative results.

B.   RESEARCH QUESTIONS AND HYPOTHESES

In this project, we explored several questions regarding social networks, specifically, friendship and venting networks, of Naval recruits during basic training.

> 1. We intend to explore the relationship between friendship networks and venting networks to identify how they may change over time and discover if they differ among different intervention groups.

> 2. Do cohesion and psychological safety scores from surveys conducted earlier in boot camp predict friendship and venting networks ties later, and is there a difference among intervention groups.

> 3. Do friendship and venting network attributes predict the level of individual and organizational resilience, and is there a difference between intervention groups?

The preceding research questions led us to the following hypotheses.

> *Hypothesis 1:*
>
> *a) We expect to find divisions who receive interventions will display higher density and reciprocity scores in their friendship and venting networks compared to the control group divisions.*
>
> *b) Friendship and venting networks will be positively related and there will be a higher correlation between the networks of divisions who received interventions compared to those who did not.*

Hypothesis 2:

a) Division recruits with higher cohesion scores initially are more likely to have relational ties in the friendship and venting networks later.

b) Division recruits with higher psychological safety scores initially are more likely to have relational ties in the friendship and venting networks later.

Hypothesis 3:

a) Division recruits with higher measures of in degree and out degree and friendship and venting networks will have higher self-reported individual resiliency scores later. Additionally, those recruits receiving interventions will report higher resilience scores.

b) Division recruits who received interventions will have higher self-reported divisional (organizational) resiliency.

C.   LIMITATIONS

In this project, we identified three potential limitations to the study that could explain why we had to reject some of our hypotheses regarding density issues with friendship and venting networks. The first limitation to the study is the attrition among the recruit divisions due to health issues or failure of an evolution. The second limitation to the study is sleep deprivation; some of the divisions were given the T4 surveys after they completed "Battle Stations," an all-night evolution. The third limitation to the study is that the recruits have the knowledge that they will soon be leaving the division causing them to breakoff lose ties. Attrition, sleep deprivation, and distancing are all contributing factors as to why the density of friendship and venting networks went down.

D.   FRIENDSHIP AND VENTING NETWORKS

Hypothesis 1 does not hold true for friendship networks. Only two divisions who received the same intervention had an increase in friendship network density and reciprocity. While, six divisions including the control groups experienced a decrease in friendship network density and reciprocity scores. Excluding D4 results, our hypothesis that divisions who received interventions will display higher T4 scores of density, and reciprocity appears to be true for venting network density and reciprocity. Our hypothesis that there is a positive correlation between friendship and venting networks is true, and

that those divisions who received interventions would have a higher correlation between their networks appears to hold true as well. The two divisions who do not hold true to our hypothesis can be explained by the limitations previously stated.

E.   COHESION AND PSYCHOLOGICAL SAFETY

Hypothesis 2 does not hold true for using initial cohesion and psychological safety scores to predict friendship and venting network relational ties. There appears to be no difference among intervention groups or integrated divisions. The results of the correlation indicate that relational cohesion and psychological safety scores at T2 are not useful tools to predict friendship network and/or venting network ties at T4. This leads us to reject our hypothesis that higher relational cohesion and psychological safety scores between recruits at T2 will correlate to a tie in the friendship or venting network at T4.

F.   INDIVIDUAL AND ORGANIZATIONAL RESILIENCE

Hypothesis 3.a., proposed that T2 individual attributes, such as higher measures of in-degree and out-degree within the friendship and venting networks, will predict higher individual and divisional resiliency scores at T4. Hypothesis 3.b., also proposed that, those recruits receiving interventions will report higher T4 resiliency scores compared to the control group. The results confirm portions of our third hypothesis, the T2 friendship network measure of out-degree is a good predictor of divisional resilience at T4. However, T2 network measures were not good predictors for T4 individual resilience. Among the interventions, our regression models indicate that Intervention 3 was a good predictor of individual resilience and that Intervention 2 was a good predictor of divisional resilience. Additionally, Intervention 1 was statistically significant for divisional resilience, but had a negative relation.

G.   CONCLUSION

The intent of this study is to identify the relationship possibilities between friendship networks, venting networks, and resilience. We elected to use quantitative analysis approach to conduct the research, in order to analyze and identify any correlations between these relationships and resilience, and any impacts from resilience

interventions. After carefully examining and analyzing the data set and quantitative study results, along with our preset limitations and hypotheses, the quantitative study results confirmed some of our hypotheses at the beginning of the study, and conclude the positive correlations for relationships between friendship and venting networks, and resilience. The intervention methods used in the research demonstrate positive effects on the network attributes, as well as individual and divisional resilience. This study provides a base and introduction for future research of resilience intervention, and their impacts on social networks in the military, in order to promote and enrich resilience among military members. We truly believe the Navy will be able to utilize this research, as well as other similar studies that have been conducted in the past, as the foundation, to further apply these proven concepts, along with concrete psychological and social interventions, to allow for an improved and resilient fighting force.

H.   FUTURE RESEARCH

The resilience study we used for this project collected a large amount of data and has many options for future research. We have identified three possible options for future research. The first option for future research, why is there no correlation between relational cohesion and psychological safety scores at T2, and friendship network and/or venting network ties at T4. The second option for future research is the role of gender in friendship and venting networks, and how it relates to resilience. The third option for future research is the role of ethnicity in friendship and venting networks, and how it relates to resilience.

APPENDIX. NETWORK DIAGRAMS

Yellow Circles = Female Recruits, Blue Squares = Male Recruits, Red Line = Reciprocated Connection, Blue Line = One-Way Connection
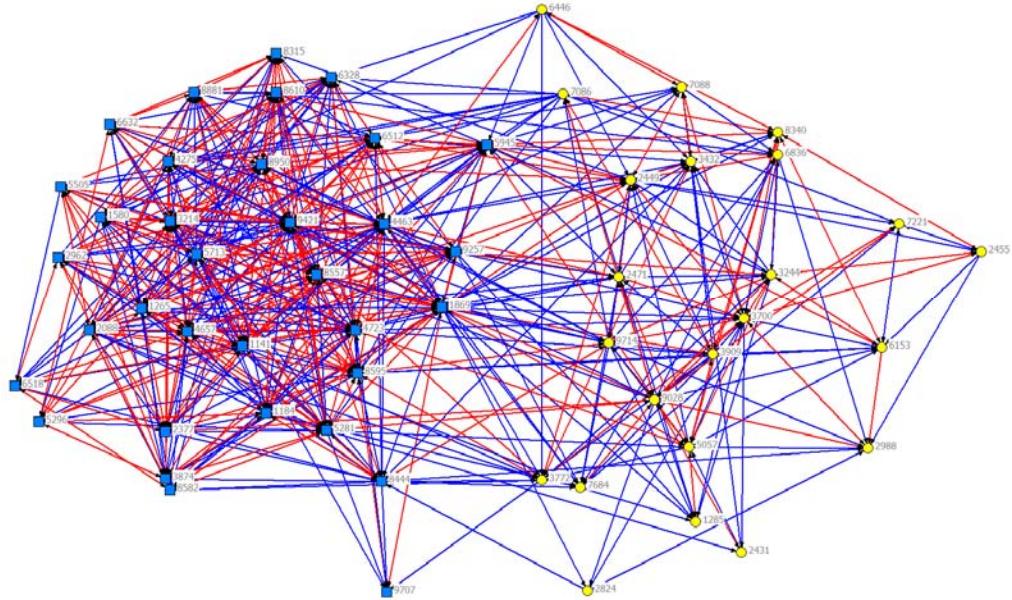
Figure 9. Division 1 Friendship Network at T2. Integrated Division–Received No Intervention
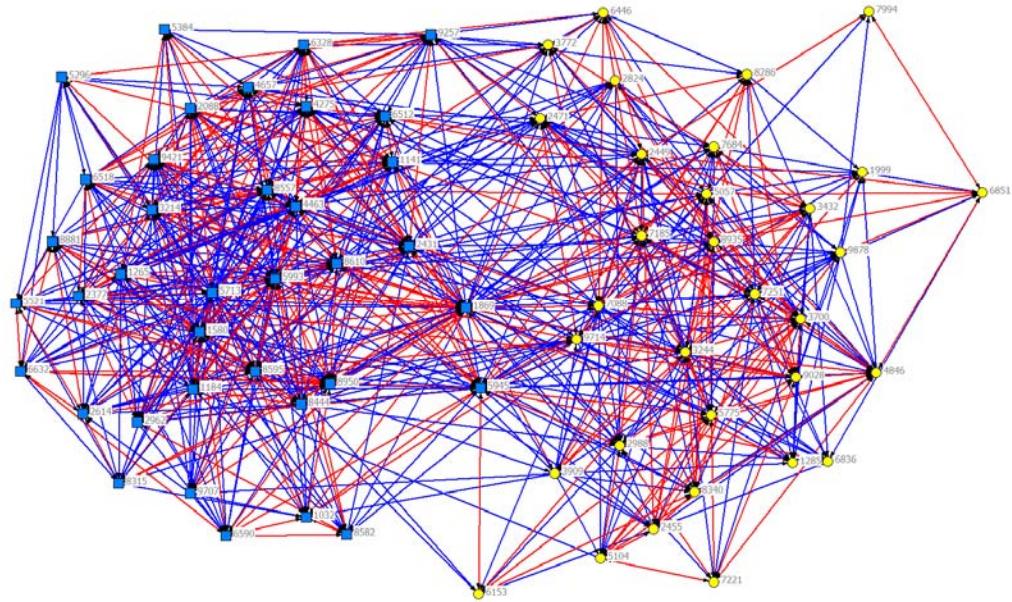
Figure 10. Division 1 Friendship Network at T4. Integrated Division–Received
No Intervention
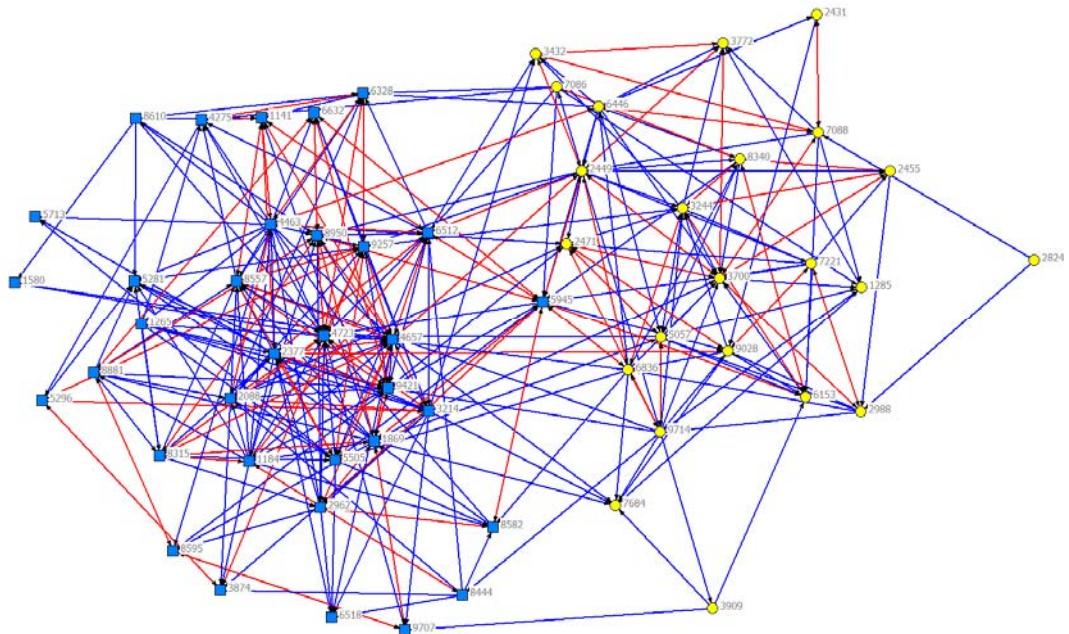
Figure 11. Division 1 Venting Network at T2. Integrated Division–Received No
Intervention
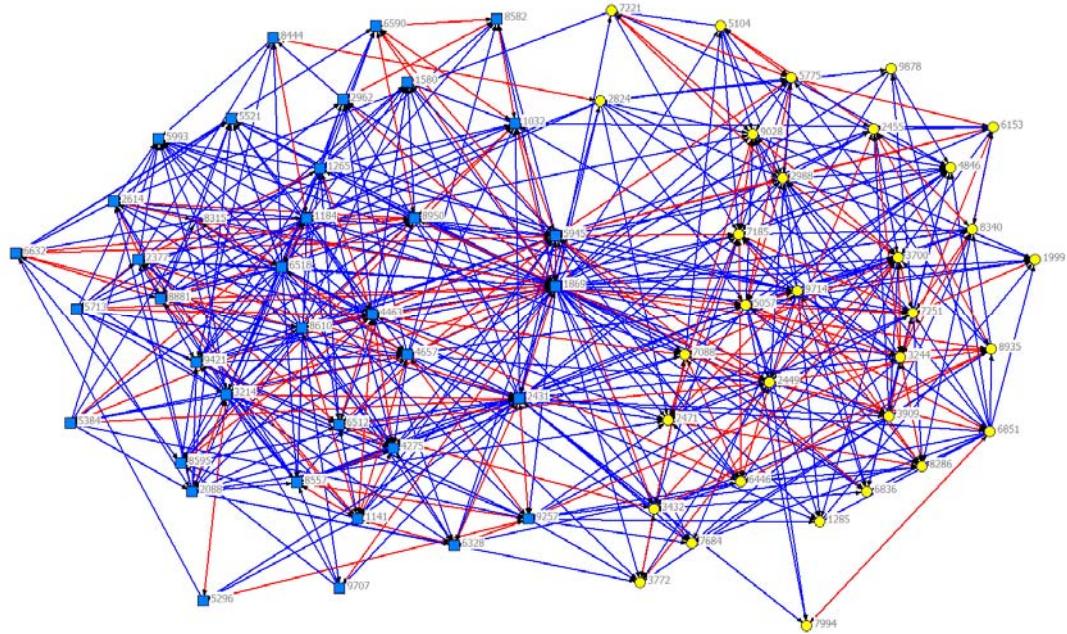
Figure 12. Division 1 Venting Network at T4. Integrated Division–Received No Intervention
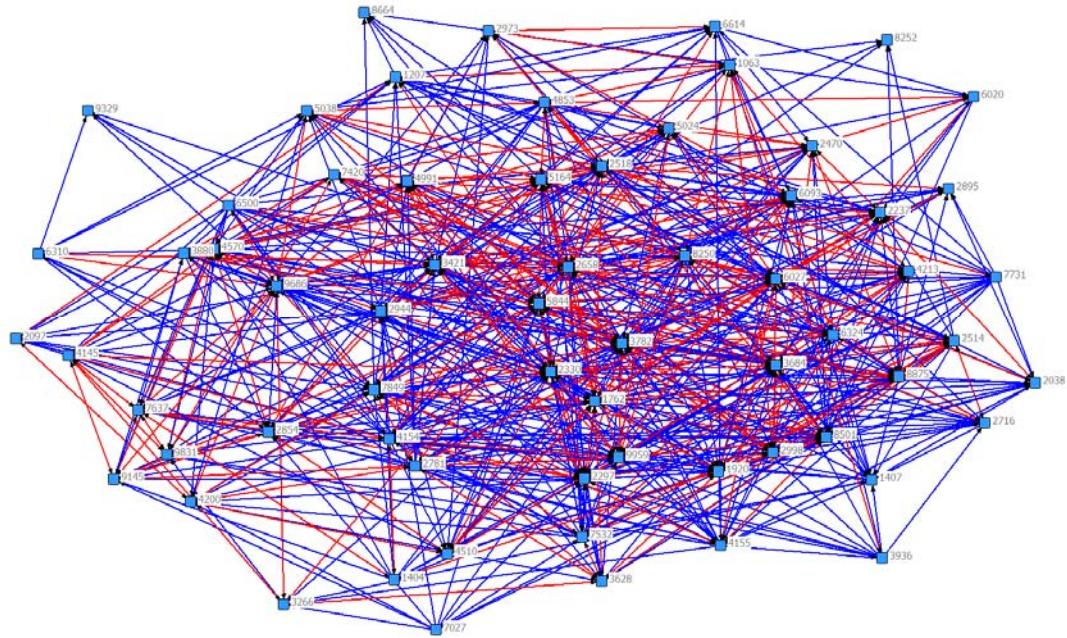
Figure 13. Division 2 Friendship Network at T2. Non-Integrated Division–Received No Intervention
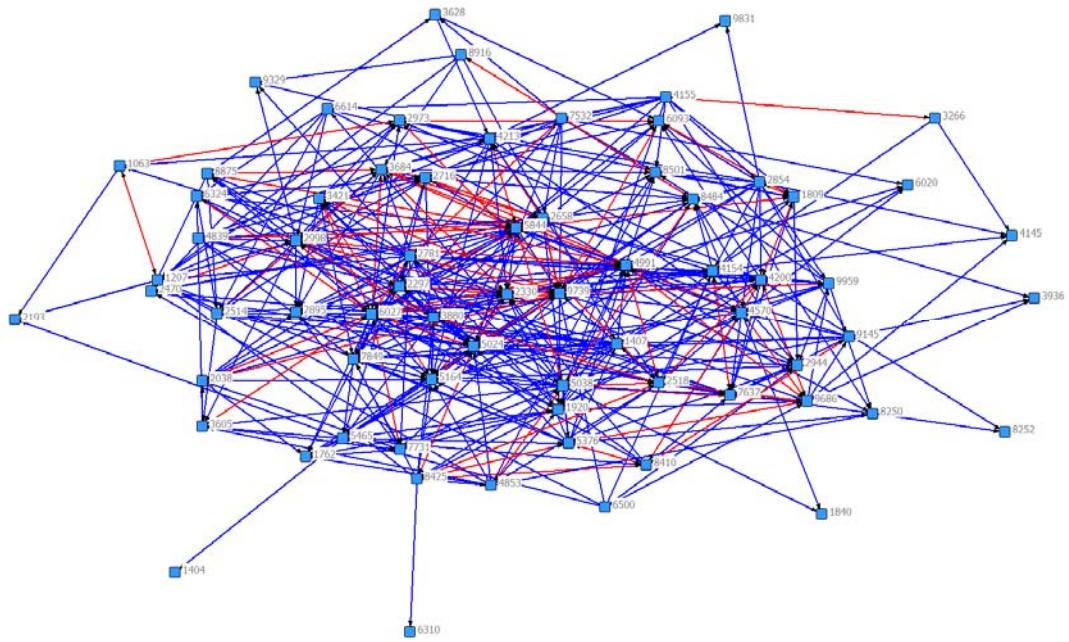
Figure 14. Division 2 Friendship Network at T4. Non-Integrated Division–
Received No Intervention
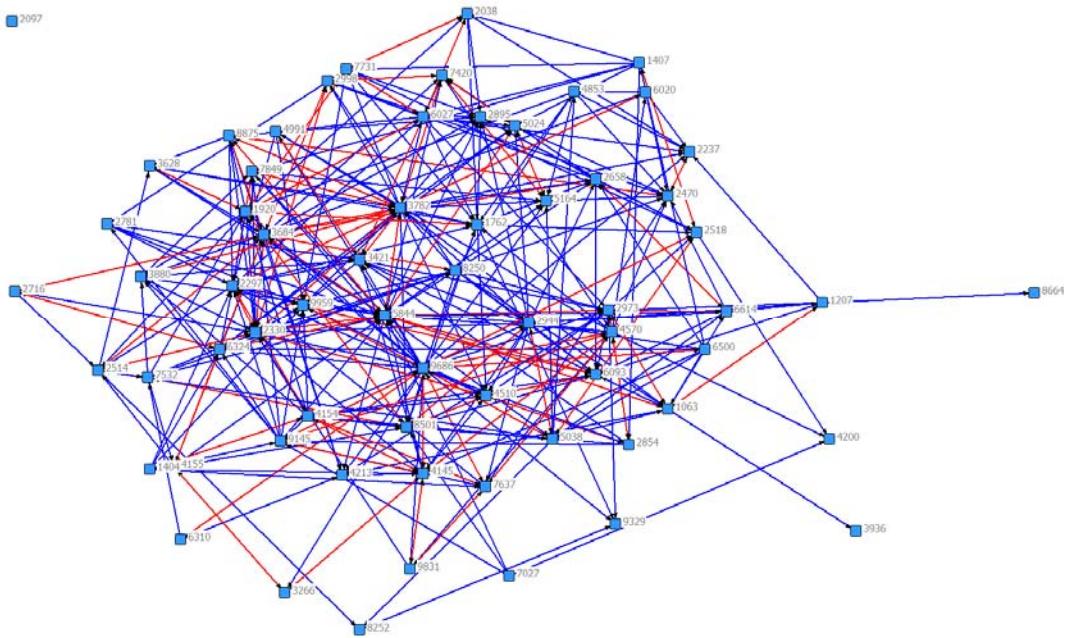
Figure 15. Division 2 Venting Network at T2. Non-Integrated Division–Received
No Intervention
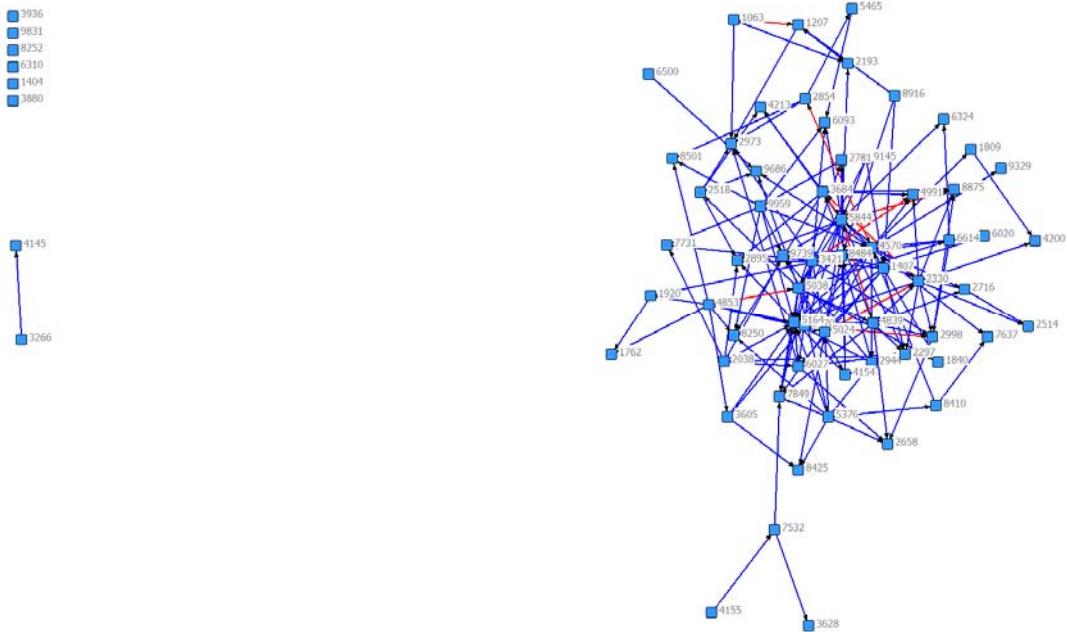
Figure 16. Division 2 Venting Network at T4. Non-Integrated Division–Received
No Intervention
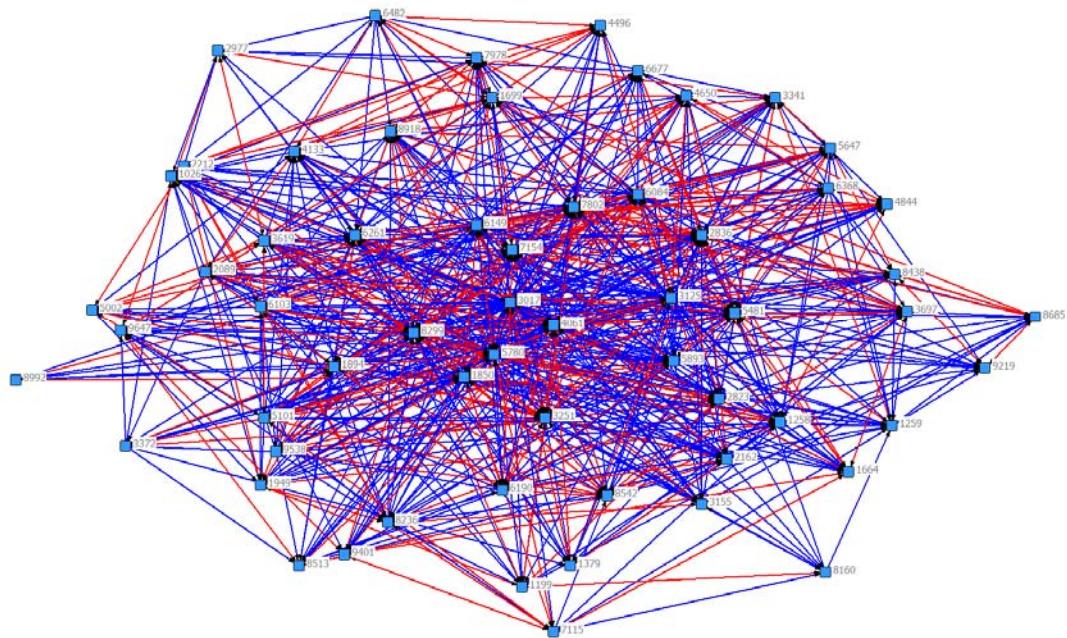
Figure 17. Division 3 Friendship Network at T2. Non-Integrated Division–
Received Intervention 1
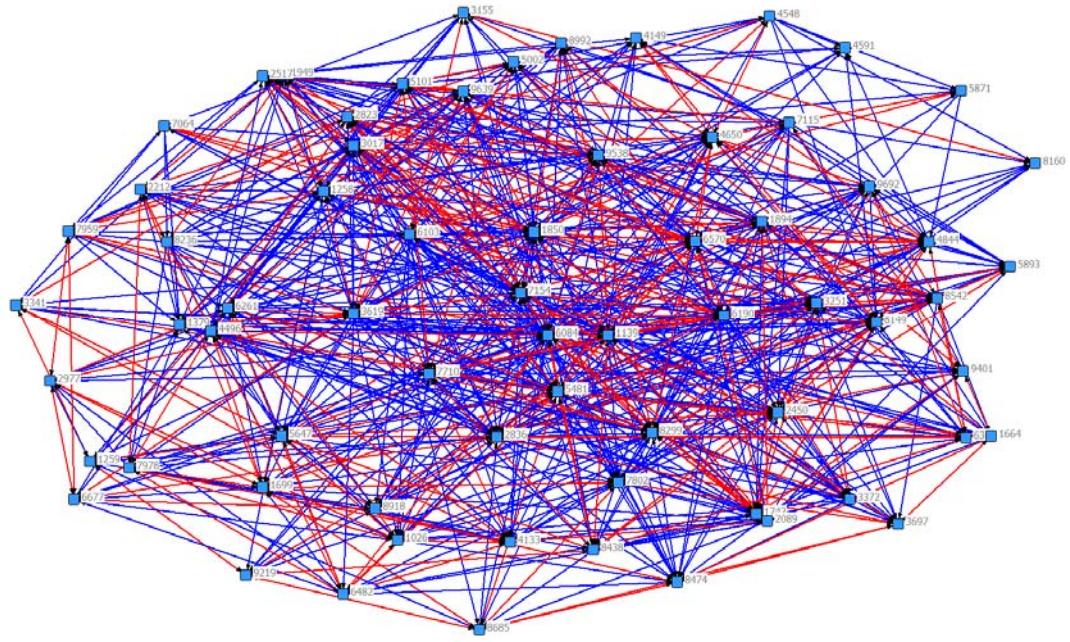
Figure 18. Division 3 Friendship Network at T4. Non-Integrated Division–
Received Intervention 1
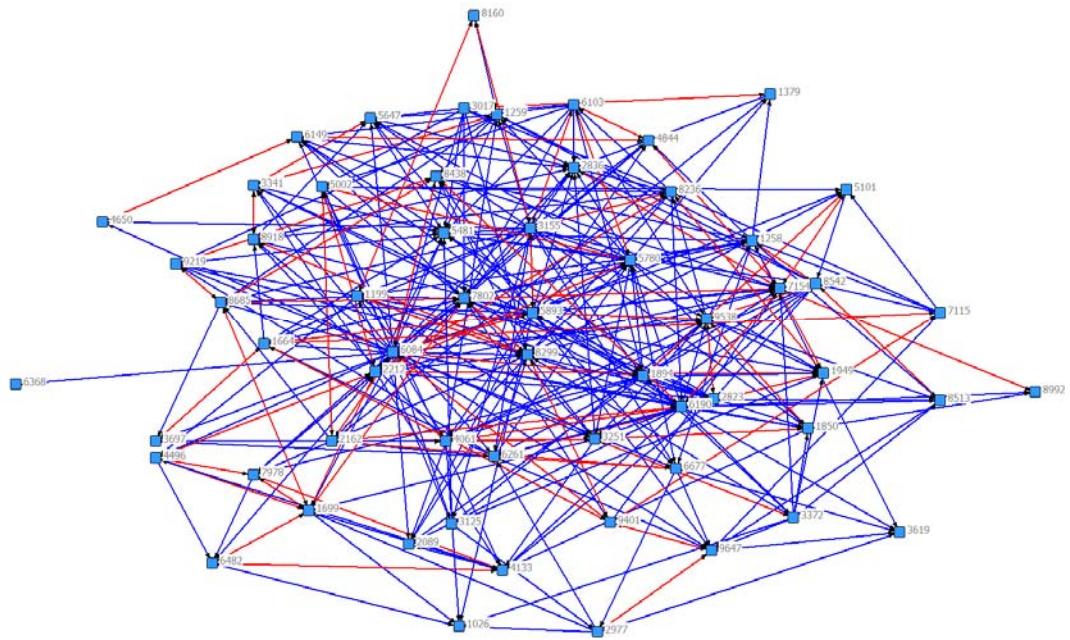
Figure 19. Division 3 Venting Network at T2. Non-Integrated Division–Received
Intervention 1
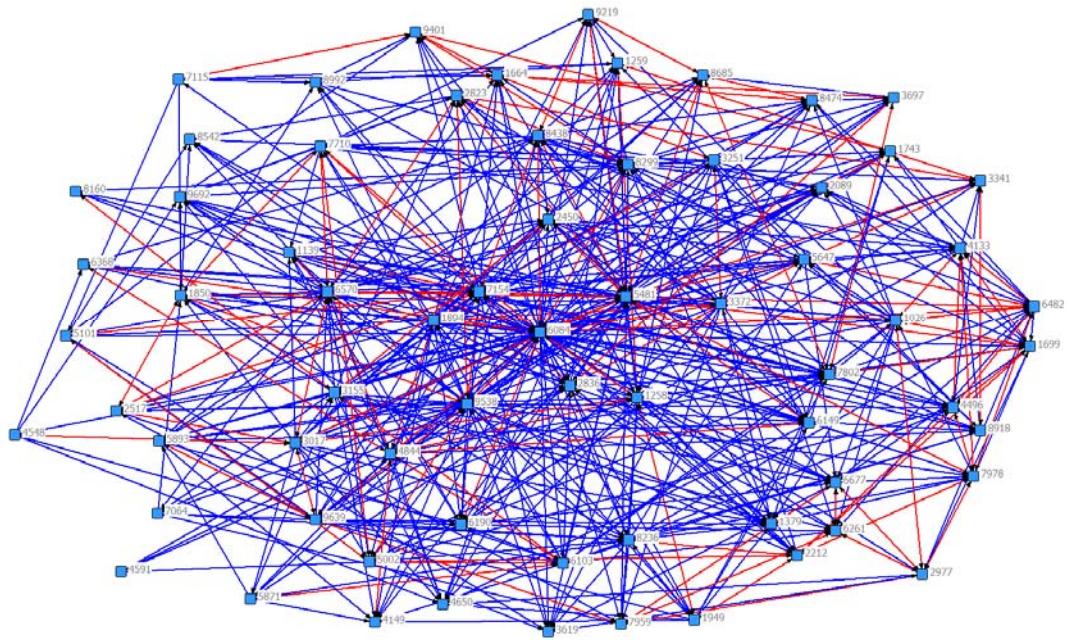
Figure 20. Division 3 Venting Network at T4. Non-Integrated Division–Received Intervention 1
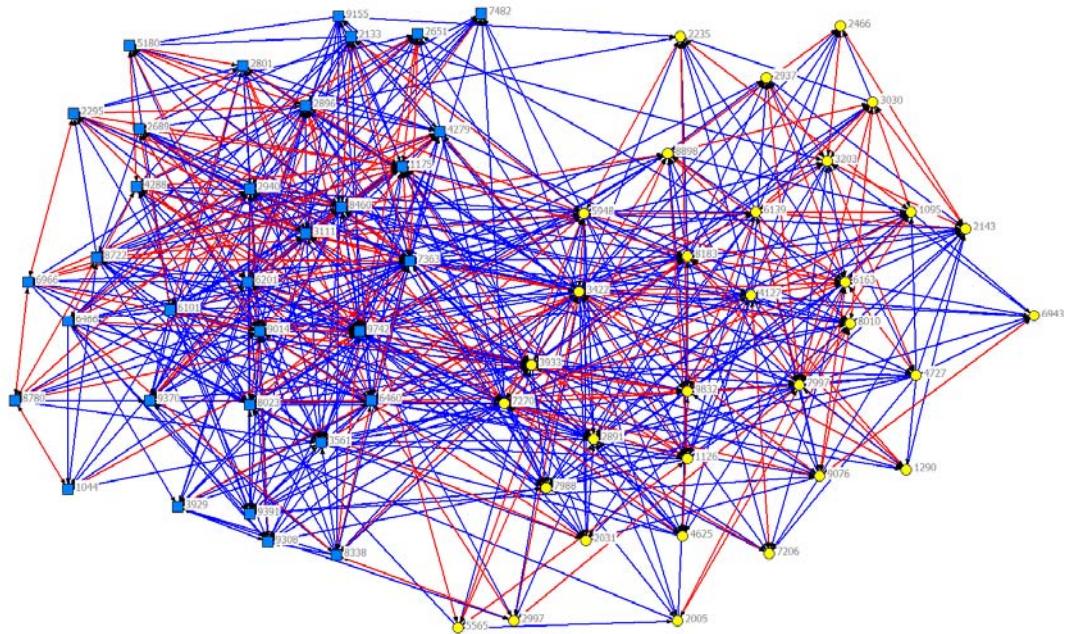
Figure 21. Division 4 Friendship Network at T2. Integrated Division–Received Intervention 1
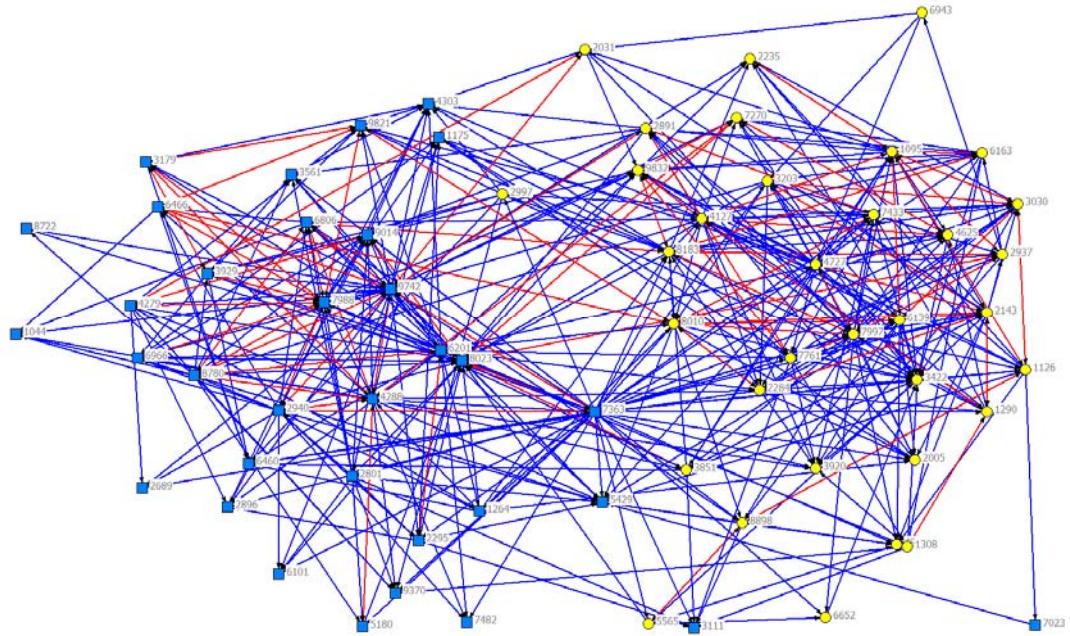
Figure 22. Division 4 Friendship Network at T4. Integrated Division–Received
Intervention 1
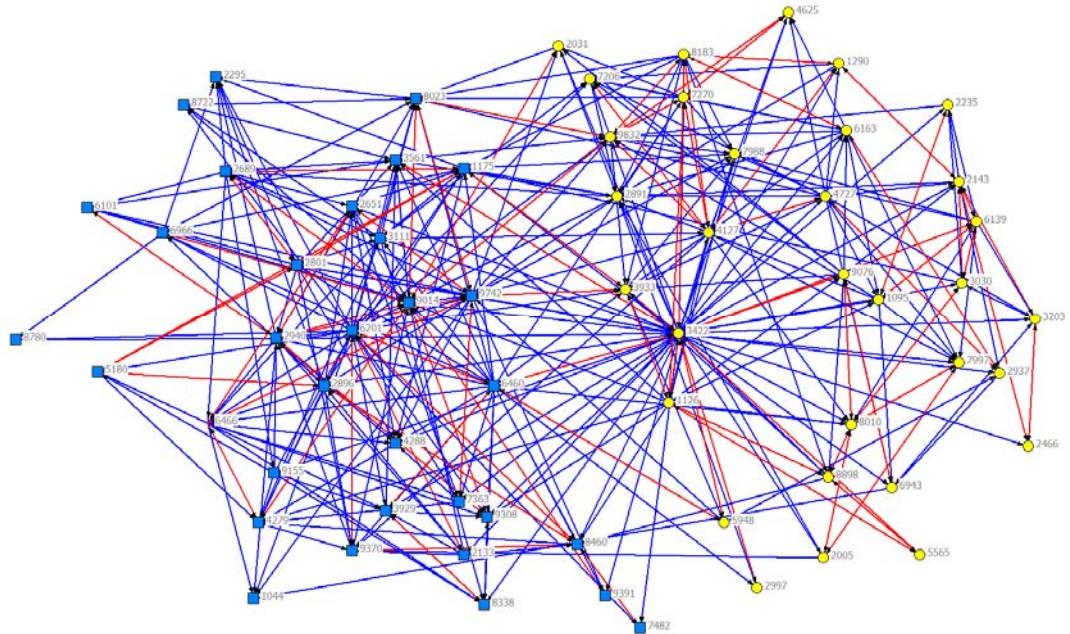
Figure 23. Division 4 Venting Network at T2. Integrated Division–Received
Intervention 1
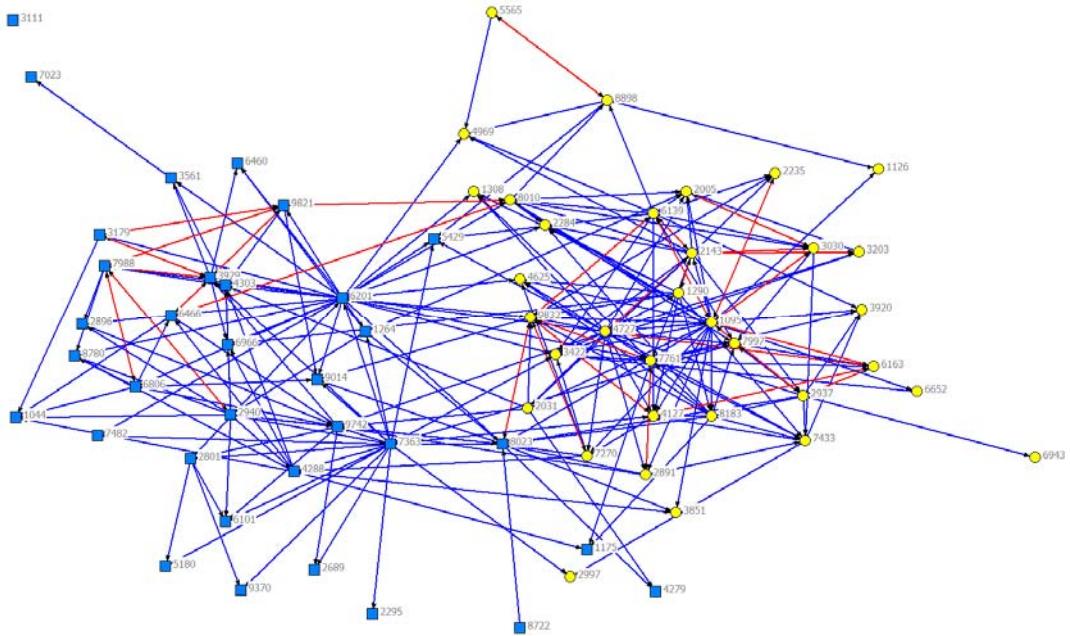
Figure 24. Division 4 Venting Network at T4. Integrated Division–Received Intervention 1
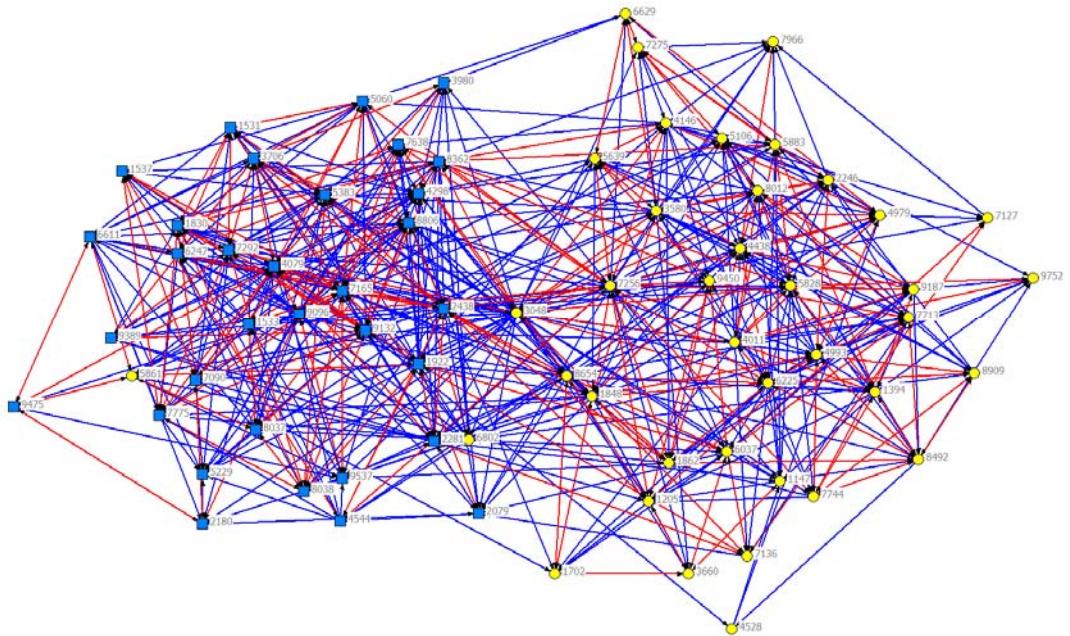
Figure 25. Division 5 Friendship Network at T2. Integrated Division–Received Intervention 2

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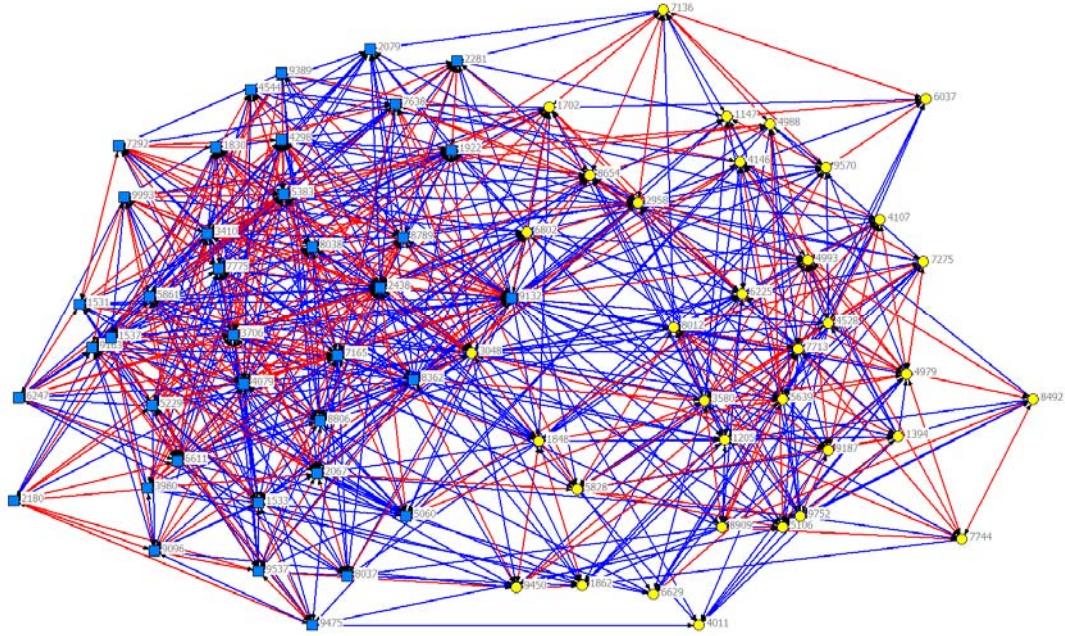
Figure 26. Division 5 Friendship Network at T4. Integrated Division–Received
Intervention 2
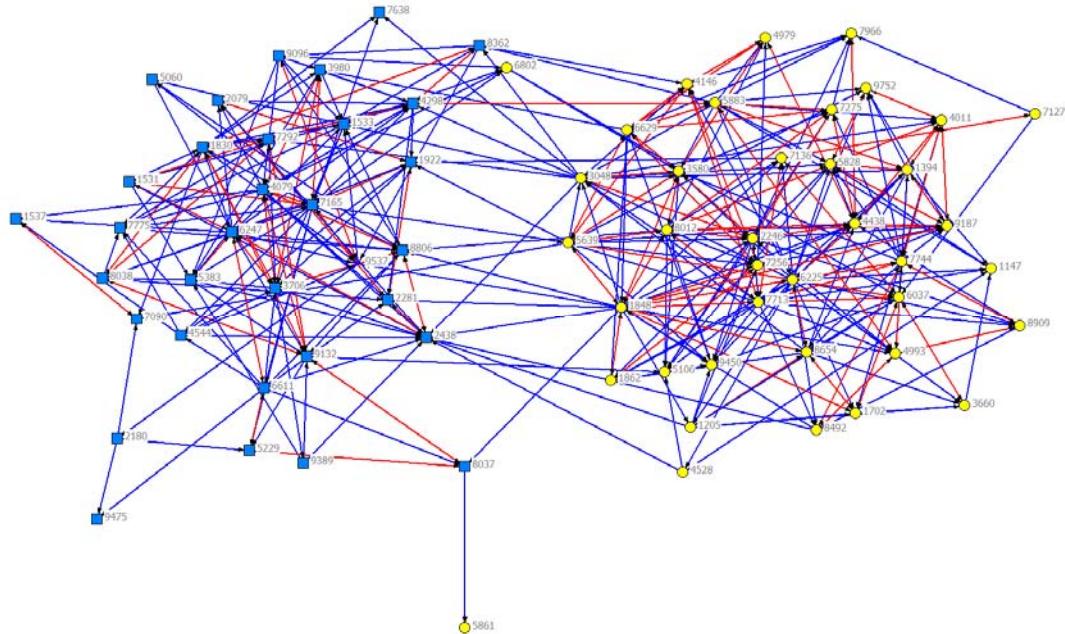
Figure 27. Division 5 Venting Network at T2. Integrated Division–Received
Intervention 2
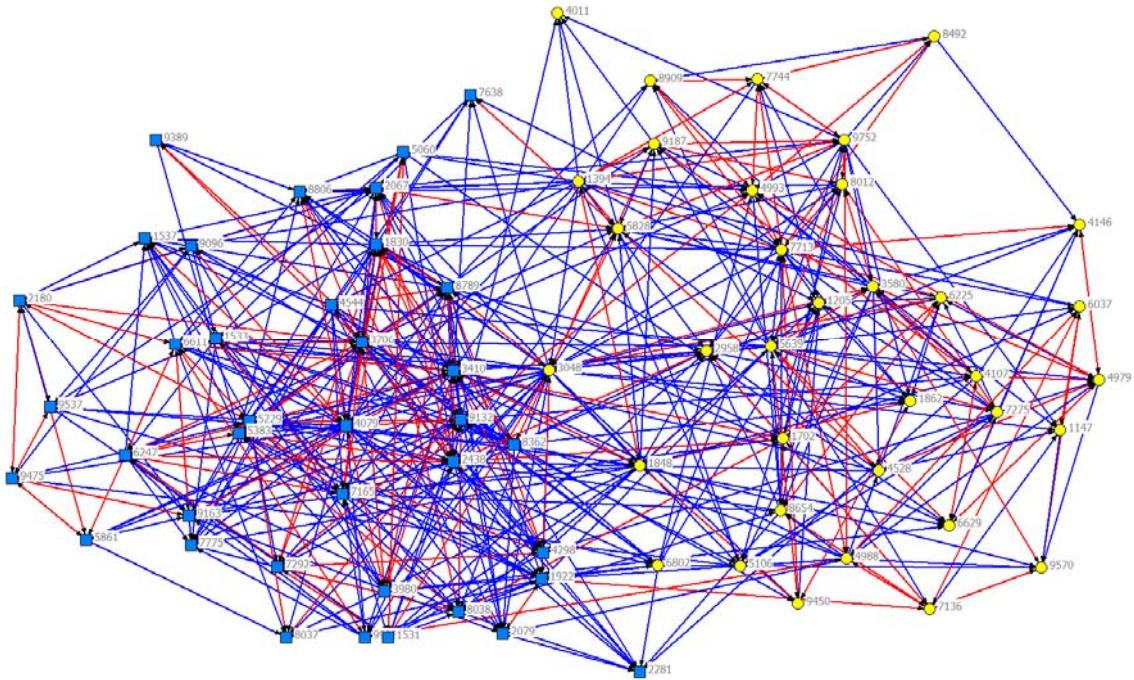
Figure 28. Division 5 Venting Network at T4. Integrated Division–Received Intervention 2
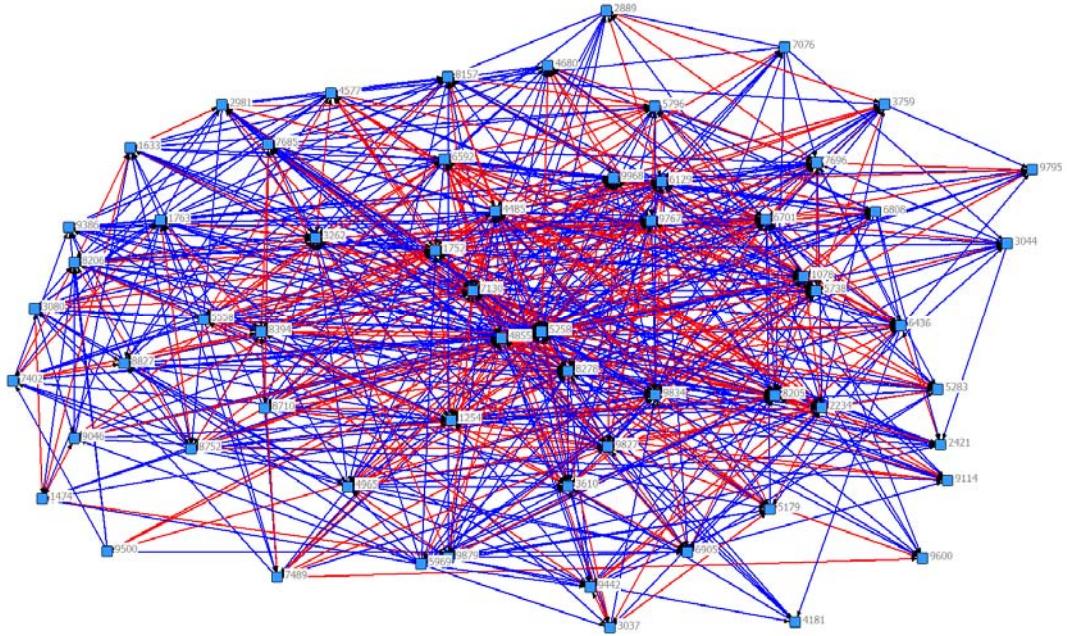
Figure 29. Division 6 Friendship Network at T2. Non-Integrated Division–
Received Intervention 2
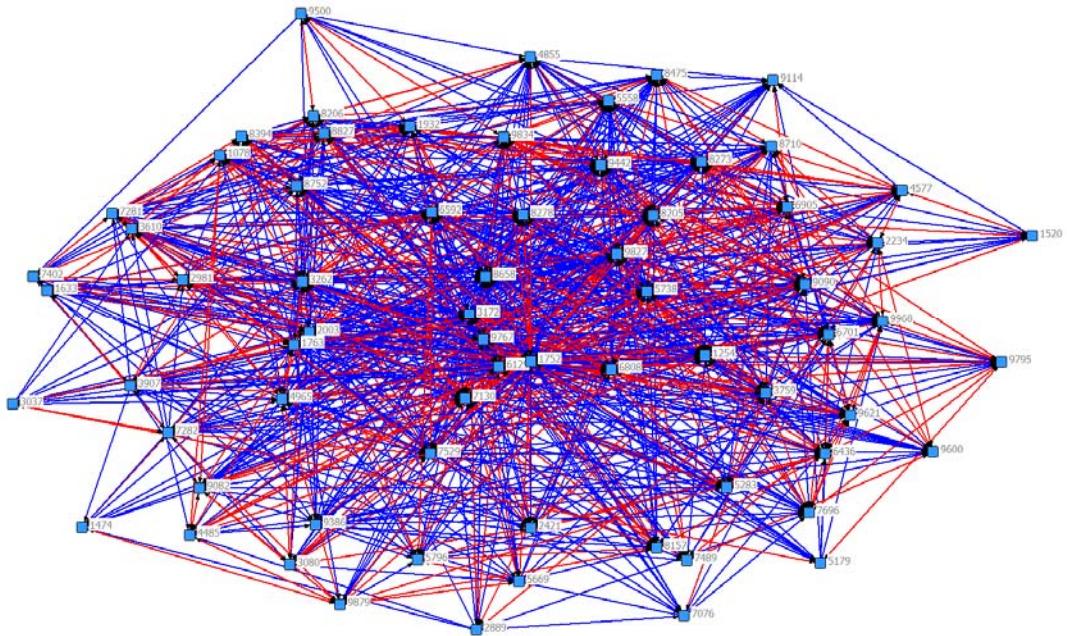
Figure 30. Division 6 Friendship Network at T4. Non-Integrated Division–
Received Intervention 2
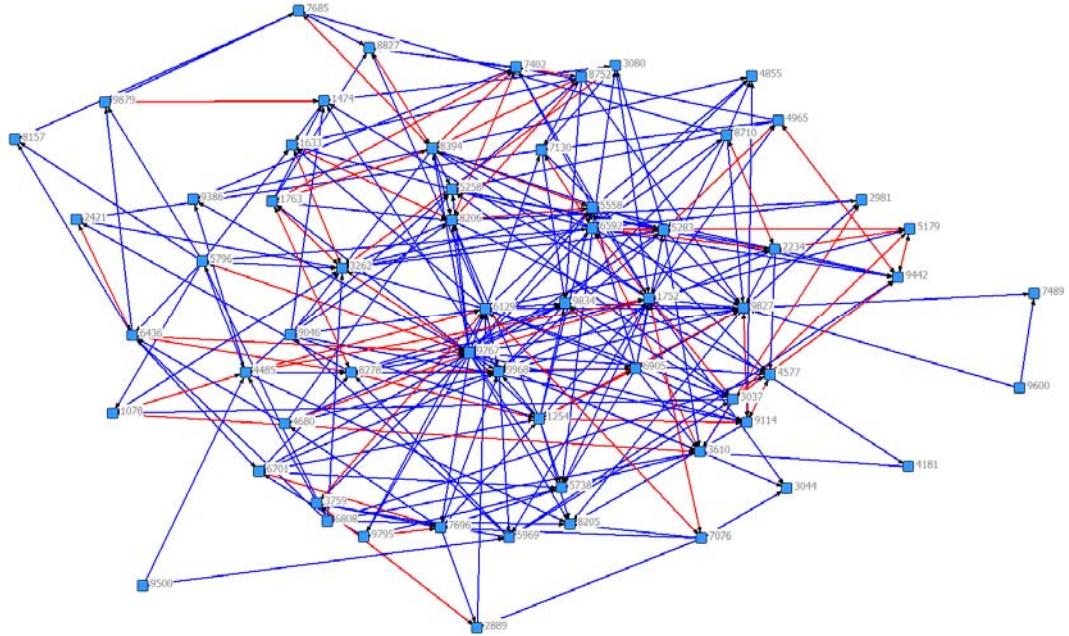
Figure 31. Division 6 Venting Network at T2. Non-Integrated Division–Received
Intervention 2
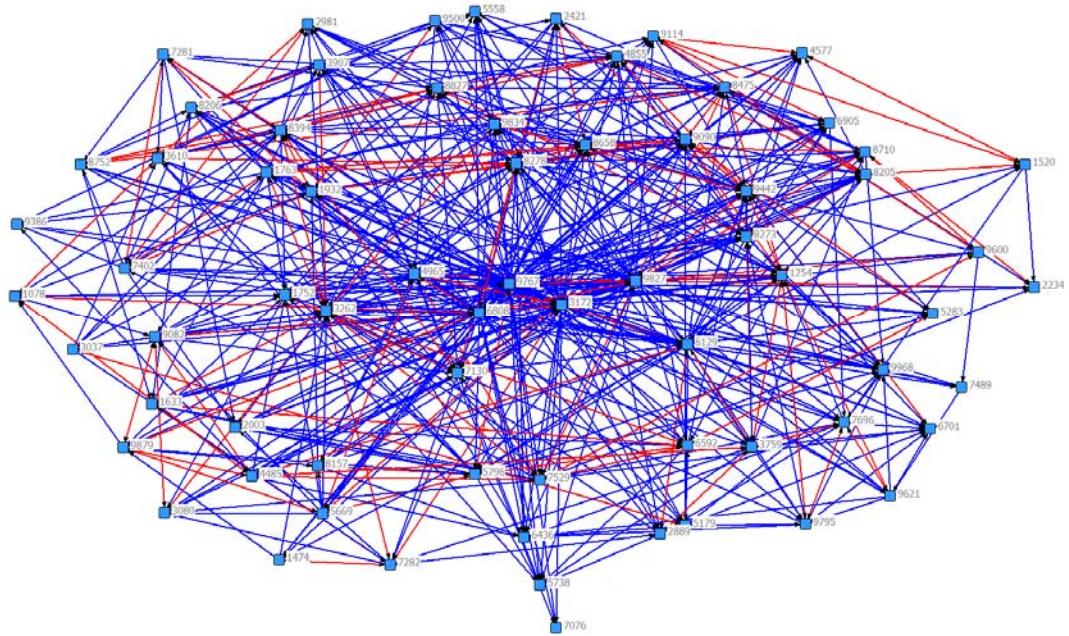
Figure 32. Division 6 Venting Network at T4. Non-Integrated Division–Received
Intervention 2
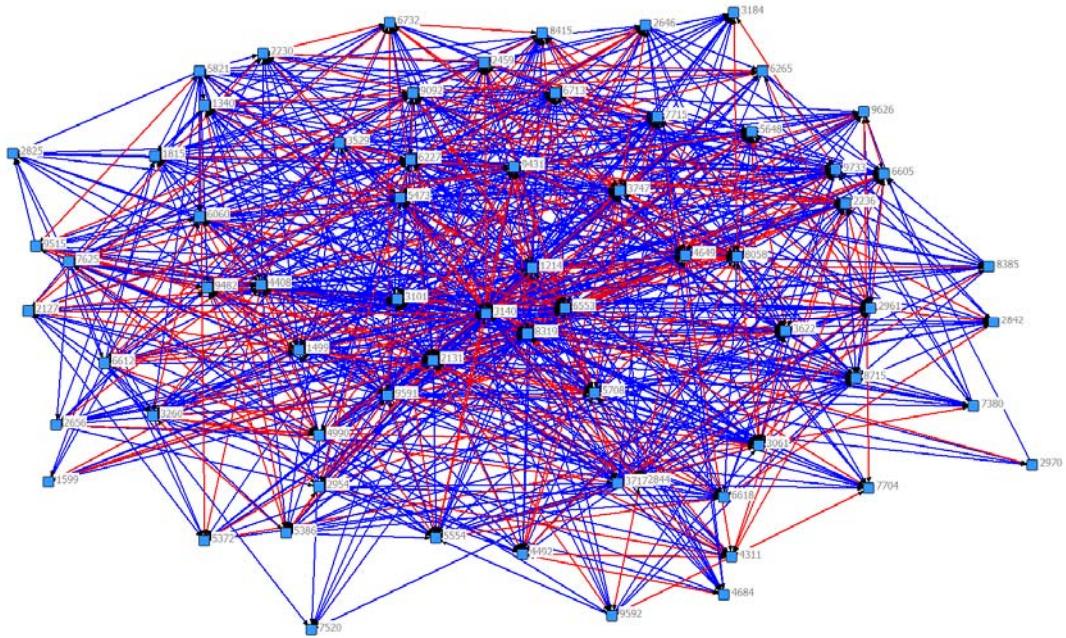
Figure 33. Division 7 Friendship Network at T2. Non-Integrated Division–
Received Intervention 3
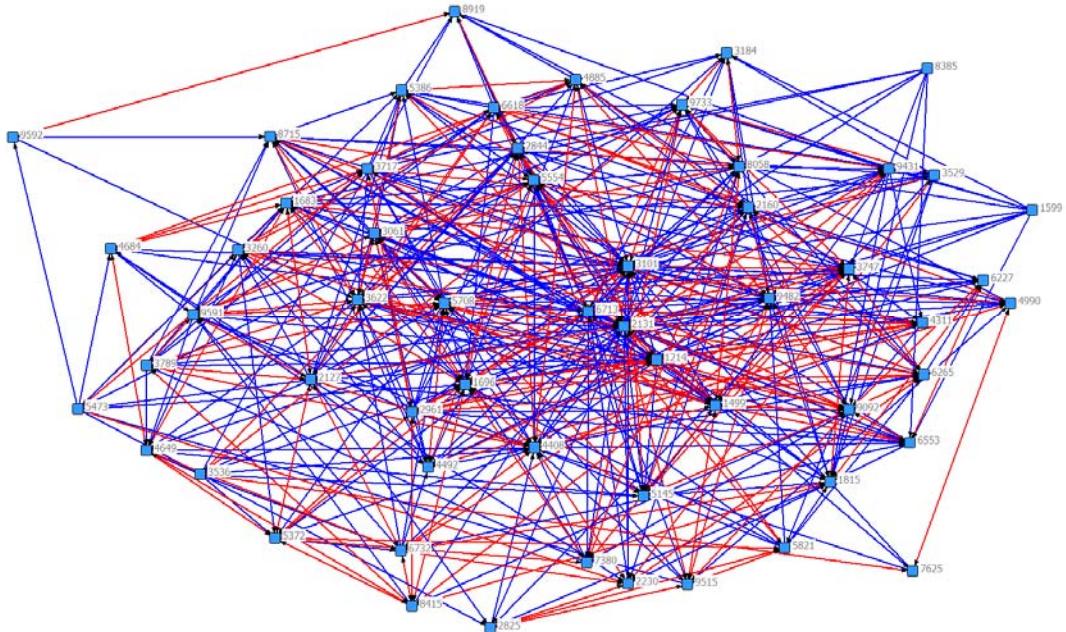
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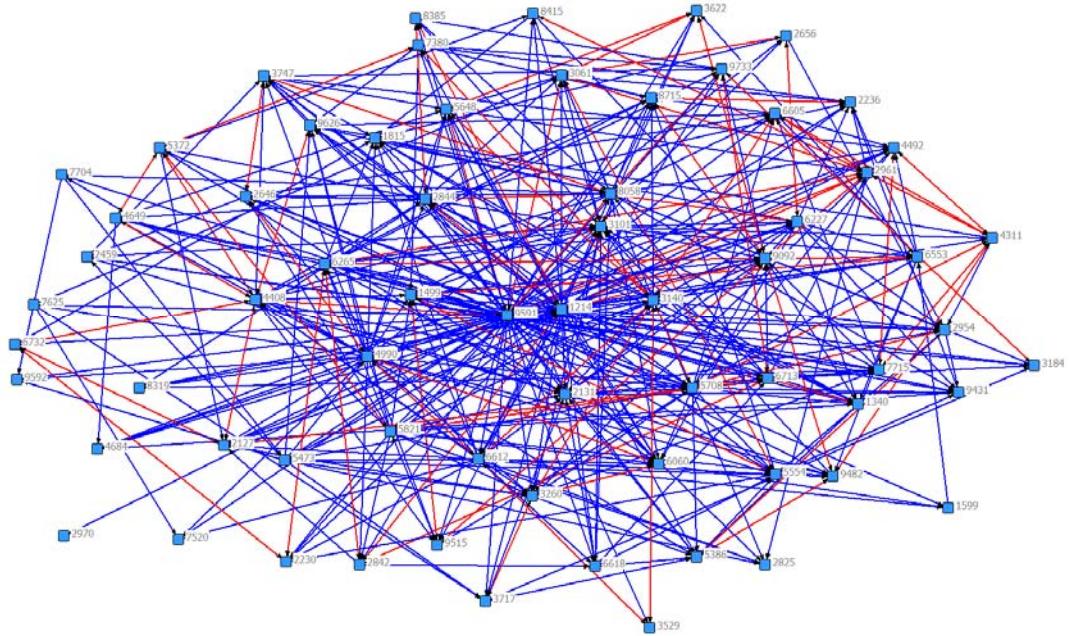
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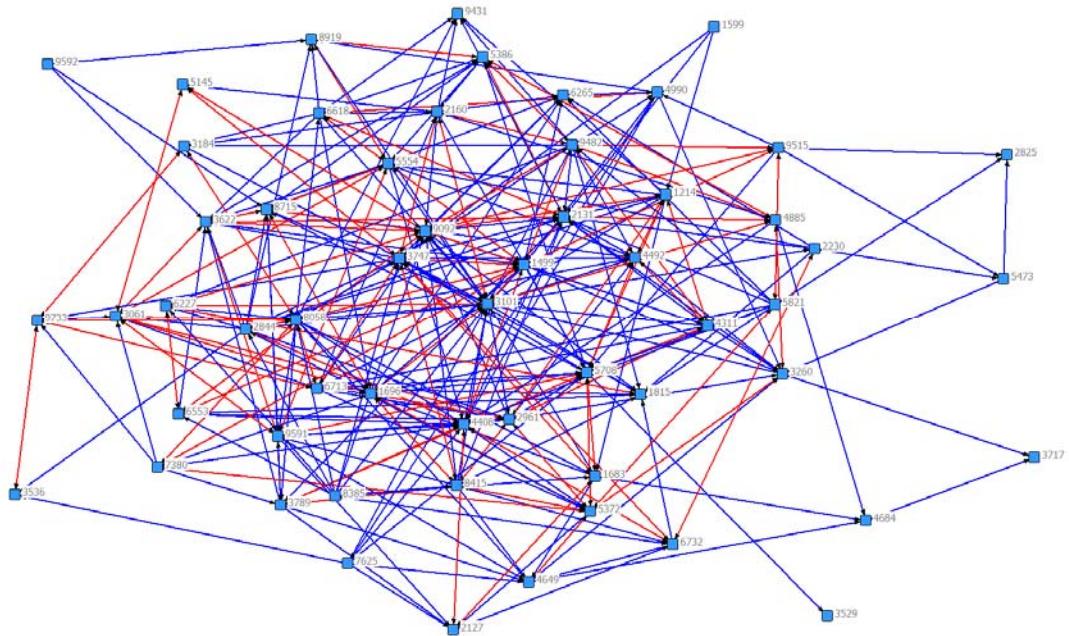

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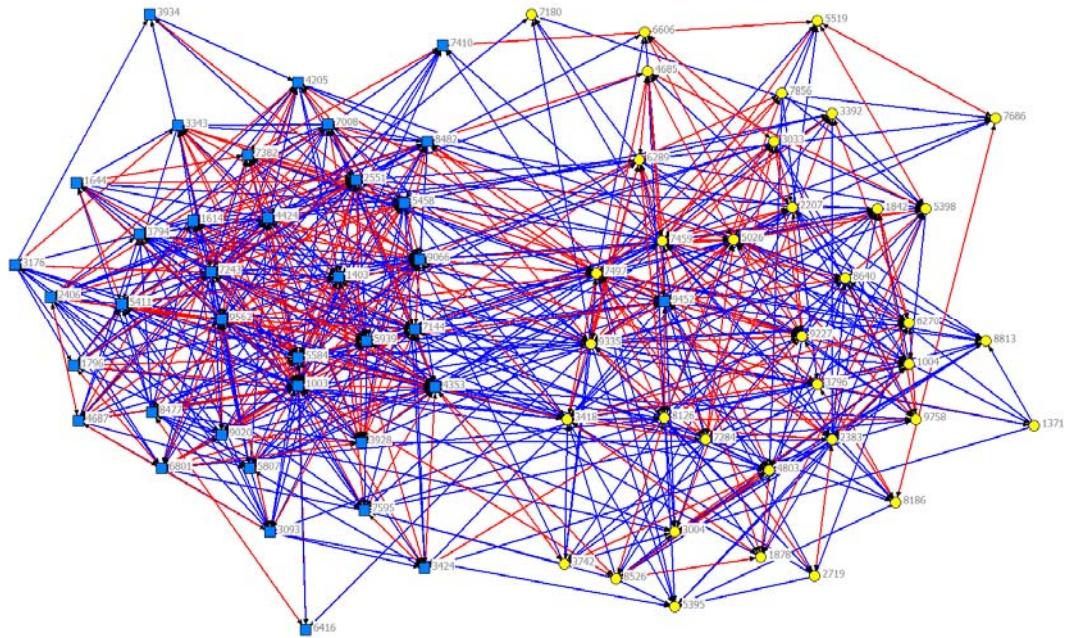
Figure 37. Division 8 Friendship Network at T2. Integrated Division–Received Intervention 3
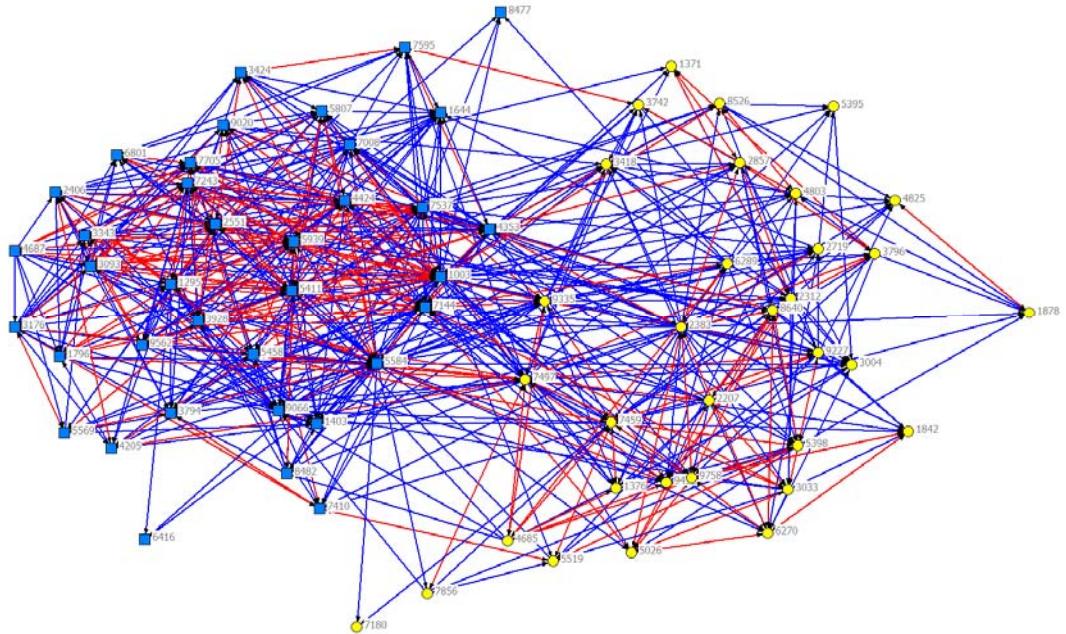
Figure 38. Division 8 Friendship Network at T4. Integrated Division–Received Intervention 3
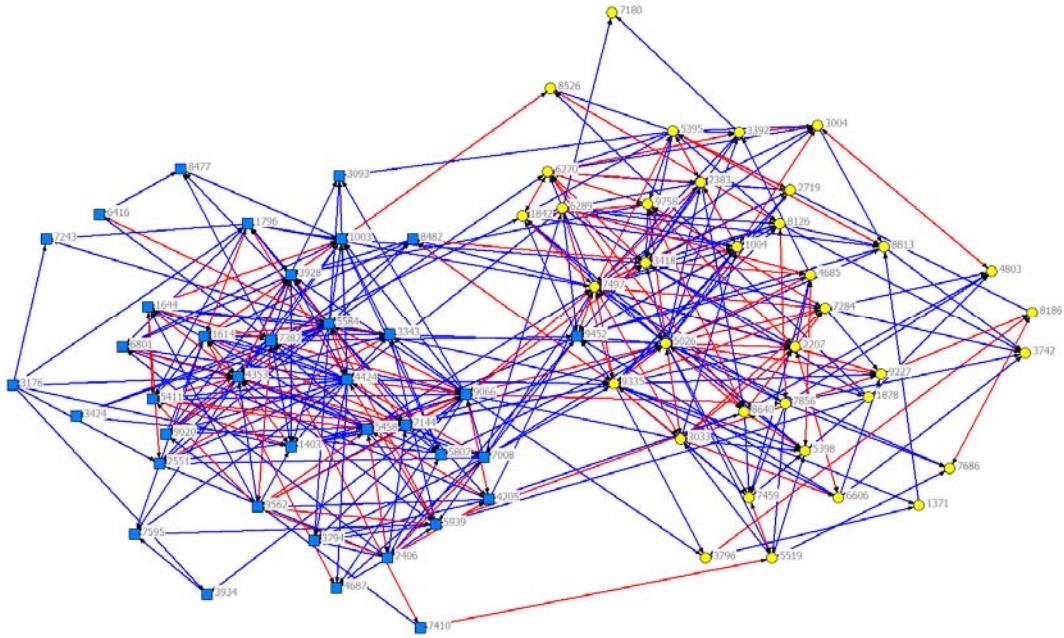
Figure 39. Division 8 Venting Network at T2. Integrated Division–Received
Intervention 3
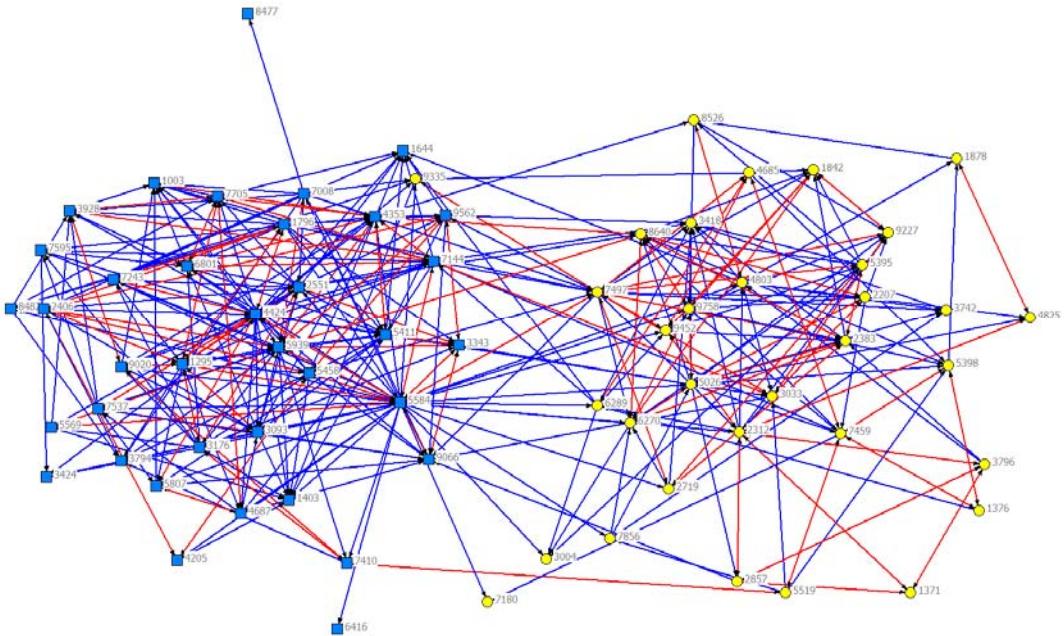
Figure 40. Division 8 Venting Network at T4. Integrated Division–Received
Intervention 3

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